TA
401
A5
Index
v.13-20
cop.2

AMERICAN SOCIETY

FOR

TESTING MATERIALS

ORGANIZED IN 1898
INCORPORATED IN 1902

INDEX TO PROCEEDINGS

VOLUMES XIII-XX

(1913-1920)

78874
19.9.23.

PUBLISHED BY
AMERICAN SOCIETY FOR TESTING MATERIALS
1315 Spruce Street, Philadelphia, Pa.
1923

TA
401
A5
Index
V13-20
copy 2

Entered according to Act of Congress by the
AMERICAN SOCIETY FOR TESTING MATERIALS,
in the office of the Librarian of Congress, at Washington.

Printed in Philadelphia, U. S. A.

PREFACE.

The Index covers the contents of Volumes XIII to XX, inclusive (1913–1920), of the Proceedings of the American Society for Testing Materials completely, exclusive only of routine business. In 1913 the Proceedings were published in one volume. In the remaining years covered by the Index, the Proceedings appeared in two volumes, Part I containing committee reports, discussions and, since 1916, tentative standards, and Part II technical papers and discussions. The contents of the individual volumes appear in the Table of Contents of Proceedings that follows the Index.

Committee reports have been indexed in two ways: First, each committee report is indexed under the subject designated in its title, at which place a synopsis of the successive reports of the committee is given; second, the subjects covered in the committee reports, including all specifications, methods, definitions, etc., are indexed under the appropriate key words. Titles of papers are distinguished by quotation marks.

The list of key words in the Subject Index is given separately at the beginning of the volume. This list, it is believed, will prove a convenience in determining the key word or key words under which the subject sought is likely to appear, before turning to the Subject Index itself. The key words are not restricted to the words in the titles of reports and papers, but the aim has been to further facilitate the search for information on important subjects by directing attention through the key words to pertinent matter in the body of the text of reports, papers and discussions. The cross references between key words serve to refer the reader to other places in the Index where information on the subject first consulted might also be found, or to topics that are related to the subject first consulted.

In the Author Index, references to committee reports appear under the names of the chairmen, vice-chairmen and secretaries of the committees concerned.

KEY WORDS
IN
SUBJECT INDEX.

A

PAGE

Abrasion 19
See also **Wearing Properties** (page 106).
Absorption 19
See also **Brick** (page 31); **Drain Tile** (page 48); **Sewer Pipe** (page 82).
Addresses 19
Aggregates 20
See also **Sand** (page 80); **Stone** (page 92).
Air-Line Hose.
See **Hose** (page 55).
Airplane 21
Alloy Steels 21
See also **Steel, Reports of Committee** (page 89).
Alloys 22
Alloys, Reports of Committee 25
Alternating Stress 26
Alumina 26
Aluminum 26
See also **Alloys** (page 22).
Analyses.
(Methods of analyses are indexed under the subjects covered by them.)
Annealing.
See **Heat Treatment** (page 54).
Antimony 27
See also **Alloys** (page 22).
Apparatus.
See **Testing Apparatus** (page 95).
Ash.
See **Coal** (page 38); **Coke** (page 39).
Asphalt.
See **Bituminous Materials** (page 29).
Automobile Steels.
See **Steel** (page 87).
Axles 27
See also **Steel, Reports of Committee** (page 89).

B

Babbitt Metal 28
See also **Alloys** (page 22).
Bars 28
See also **Reinforcement Bars** (page 75); **Splice Bars** (page 86).
Beams 28
Bearings 28

PAGE

Belting 28
Bessemer.
See **Steel** (page 87).
Bituminous Materials 29
See also **Oils** (page 65); **Road Materials** (page 76).
Blooms, Billets and Slabs.
See **Forgings** (page 51); **Steel** (page 87).
Boiler Tubes.
See **Tubes** (page 104).
Boilers 30
Boxes.
See **Shipping Containers** (page 83).
Brass 30
See also **Alloys** (page 22).
Brick 31
See also **Refractories** (page 73).
Bridges 32
See also **Steel, Reports of Committee** (page 89).
Brinell Hardness.
See **Hardness** (page 53).
Bronze 32
See also **Alloys** (page 22).
Building Brick.
See **Brick** (page 31).
Building Tile 33

C

Calcium 33
Carbon Residue 33
Car Wheels.
See **Wheels** (page 107).
Cars 33
See also **Steel, Reports of Committee** (page 89).
Cast Iron 34
See also **Castings** (page 34).
Castings 34
See also **Cast Iron** (page 34); **Steel** (page 87).
Cement 35
Cement Sewer Pipe.
See **Sewer Pipe** (page 82).
Ceramics.
See **Clay Products** (page 37).
Chain 37
Chemical Analyses.
(Methods of chemical analyses are indexed under the subjects covered by them.)
Chinese Wood Oil.
See **Tung Oil** (page 104).
Chrome Steel 37

PAGE

Clay 37
See also Clay Products (page 37).
Clay Products 37
See also Building Tile (page 33); Drain Tile (page 48); Refractories (page 73); Sewer Pipe (page 82).
Clay Sewer Pipe.
See Sewer Pipe (page 82).
Coal 38
Coal Tar.
See Bituminous Materials (page 29).
Coatings.
See Paints (page 67); Preservative Coatings (page 70); Protective Coatings (page 72).
Coke 39
Cold-Drawn Steel.
See Steel, Cold-Drawn (page 88).
Cold-Working 39
See also Steel, Cold-Drawn (page 88).
Color 39
Colorimetric Tests 40
Columns 40
Committee Reports.
(Each committee report is indexed under the name of the subject with which the committee is concerned.)
Compression Testing 40
Concrete 41
See also Aggregates (page 20).
Concrete, Reinforced 43
Concrete Sewer Pipe.
See Sewer Pipe (page 82).
Concrete, Waterproofing of.
See Waterproofing (page 106).
Condenser Tubes.
See Tubes (page 104).
Consistency 44
See also Penetration (page 68); Softening Point (page 84).
Copper 45
See also Alloys (page 22); Copper Wire (page 46).
Copper Wire 46
Corrosion 46
Corrosion Cracking 47
Creosote Oil 47
See also Oils (page 65).

D

Definitions.
See Nomenclature (page 64).
Density.
See Specific Gravity (page 85).

PAGE

Distillation 48
See also Bituminous Materials (page 29); Preservative Coatings, Reports of Committee (page 70).
Douglas Fir 48
See also Timber (page 101).
Drain Tile 48
See also Sewer Pipe (page 82).
Driers, Paint.
See Paints (page 67).
Drills 48
Ductility 49
See also Bituminous Materials (page 29).

E

Elasticity, Modulus of 49
Elastic Limit 49
See also Yield Point (page 109).
Emulsification 49
Enamels 49
See also Paints (page 67).
Endurance Tests.
See Fatigue (page 50); Repeated Stress (page 75).
Engine-Bolt Iron.
See Wrought Iron (page 108).
Etching.
See Metallography (page 62).
Evaporation 50
See also Oils (page 65).
Executive Committee 50
Explosives 50
Extensometer.
See Strainometer (page 93).

F

Fabrics.
See Textile Materials (page 99).
Fatigue 50
See also Repeated Stress (page 75).
Fiber 50
See also Textile Materials (page 99).
Fireboxes 51
Fire Hose.
See Hose (page 55).
Fireproofing 51
Flash Point 51
Flexure.
See Transverse Testing (page 103).
Floors.
See Fireproofing (page 51).
Forestry.
See Timber (page 101).

PAGE

Forgings 51
See also Steel, Reports of Committee (page 89).
Fuel.
See Coal (page 38); Coke (page 39).
Fusibility 52

G

Galvanizing.
See Zinc (page 109).
Girder Rails.
See Rails (page 72).
Glue 52
Grading Rules.
See Timber (page 101).
Gravel 52
Gun Metal 53
See also Alloys (page 22).
Gypsum 53

H

Hardness 53
See also Impact Testing (page 56); Toughness (page 103); Wearing Properties (page 106).
Havre de Grace Bridge Tests.
See Paints (page 67).
Heat Treatment 54
Hexabromide Number 55
Highways.
See Bituminous Materials (page 29); Brick (page 31); Concrete (page 41); Road Materials (page 76).
Hollow Building Tile.
See Building Tile (page 33).
Hose 55
Hydrated Lime.
See Lime (page 58).

I

Impact Testing 56
Industrial Research.
See Research (page 75).
Ingots 56
Instruments.
See Testing Apparatus (page 95).
Insulating Materials 57
International Association for Testing Materials 57
Iron 57
See also Cast Iron (page 34); Malleable Cast Iron (page 62); Wrought Iron (page 108).

L

PAGE

Laboratories 58
Lead 58
See also **Alloys** (page 22).
Lime 58
Linseed Oil 59
Locomotives 59
See also **Steel, Reports of Committee** (page 89).
Lubricants 60
Lumbang Oil 60

M

Macrographs.
See **Metallography** (page 62).
Magnesium 61
See also **Alloys** (page 22).
Magnetic Testing 61
Malleable Cast Iron 62
See also **Castings** (page 34).
Manganese Bronze 62
See also **Alloys** (page 22).
Manganese Steel 62
Metallography 62
Methods of Testing.
See **Testing, Methods of** (page 96).
Micrographs.
See **Metallography** (page 62).
Molybdenum Steel 63
Mortar 63
See also **Concrete** (page 41).
Muntz Metal 64
See also **Alloys** (page 22).

N

Nickel 64
See also **Alloys** (page 22).
Nickel Steel 64
Nomenclature 64
Non-Ferrous Metals and **Alloys.**
(Papers and reports on non-ferrous metals and alloys are indexed under the names of the various metals and alloys that appear as key words. For reports of the Committee on Non-Ferrous Metals and Alloys, see **Alloys** (page 22).

O

Oils 65
See also **Lubricants** (page 60).
Open Hearth.
See **Steel** (page 87).
Organic Impurities in Concrete.
See **Colorimetric Tests** (page 40).

PAGE
Overstrain 66
Oxygen 66

P

Paints 67
See also Oils (page 65); Preservative Coatings (page 70).
Papers.
See Publications (page 72).
Partitions.
See Fireproofing (page 51).
Paving.
See Bituminous Materials (page 29); Brick (page 31); Concrete (page 41); Road Materials (page 76).
Penetration 68
See also Bituminous Materials (page 29).
Perilla Oil 68
Petroleum.
See Bituminous Materials (page 29). Lubricants (page 60); Oils (page 65).
Phosphorus 68
Pig Lead.
See Lead (page 58).
Pigments 68
See also Paints (page 67).
Pipe 69
See also Drain Tile (page 48); Sewer Pipe (page 82).
Pitches.
See Bituminous Materials (page 29).
Plastic Deformation 69
See also Consistency (page 44); Penetration (page 68); Softening Point (page 84); Viscosity (page 105).
Plates 69
See also Steel, Reports of Committee (page 89); Wrought Iron (page 108).
Plywood 70
Porcelain 70
Portland Cement.
See Cement (page 35).
Preservative Coatings 70
See also Oils (page 65); Paints (page 67).
Preservative Coatings, Reports of Committee 70
Preservatives 71
See also Creosote Oil (page 47).
Pressures 72
Primers.
See Paints (page 67).
Proportional Limit.
See Elastic Limit (page 49).
Protective Coatings 72
See also Paints (page 67); Preservative Coatings (page 70).
Publications 72

Q

PAGE

Quicklime.
See **Lime** (page 58).

R

Rails 72
Recrystallization 73
Refractories 73
Regulations 74
Reinforced Concrete.
See **Concrete, Reinforced** (page 43).
Reinforcement Bars 75
Repeated Stress 75
See also **Fatigue** (page 50).
Research 75
Rivet Steel.
See **Steel** (page 87).
Road Materials 76
See also **Bituminous Materials** (page 29); **Brick** (page 31); **Concrete** (page 41).
Road Materials, Reports of Committee 78
Rock.
See **Aggregates** (page 20); **Road Materials** (page 76); **Stone** (page 92).
Rubber Products 79

S

Sampling.
(Methods of sampling are indexed under the subjects covered by them.)
Sand 80
See also **Aggregates** (page 20); **Road Materials** (page 76).
Sand-Lime Brick 81
See also **Brick** (page 31).
Scleroscope Hardness.
See **Hardness** (page 53).
Screw Spikes 81
See also **Track Spikes** (page 103).
Screw Stock 81
Season Cracking.
See **Corrosion Cracking** (page 47).
Sewer Pipe 82
See also **Drain Tile** (page 48).
Sheets 82
Shellac 82
Shipping Containers 83
Ships 83
See also **Steel, Reports of Committee** (page 89).
Sieves 83
Silica 83
Silicon Steel 83
Slag 84
See also **Aggregates** (page 20); **Road Materials** (page 76).

PAGE

Softening Point 84
See also Bituminous Materials (page 29).
Soil Pipe.
See Pipe (page 69).
Soil Pressures.
See Pressures (page 72).
Solder 85
See also Alloys (page 22).
Soya Bean Oil 85
Specifications 85
Specific Gravity 85
Spelter.
See Zinc (page 109).
Splice Bars 86
Springs 86
Standing Committees, Reports of Committee 86
Staybolts 86
Steam Hose.
See Hose (page 55).
Steel 87
Steel, Cold-Drawn 88
Steel, Corrosion of.
See Corrosion (page 46).
Steel, Heat Treatment of.
See Heat Treatment (page 54).
Steel, Magnetic Testing of.
See Magnetic Testing (page 61).
Steel Rails.
See Rails (page 72).
Steel, Reports of Committee 89
Steel, Specifications for 91
Steel, Tool.
See Tool Steel (page 102).
Steels, Alloy.
See Alloy Steels (page 21).
Stone 92
See also Aggregates (page 20); Road Materials (page 76).
Strainometer 93
Sulfur 93

T

Tanks 93
Tannic Acid 93
Tape.
See Rubber Products (page 79); Textile Materials (page 99).
Tar.
See Bituminous Materials (page 29).
Tension Testing 93

PAGE

Terne.
See **Lead** (page 58); **Tin** (page 102).

Testing.
See following **Key Words** on Testing; also **Compression Testing** (page 40); **Corrosion** (page 46); **Fatigue** (page 50); **Hardness** (page 53); **Impact Testing** (page 56); **Repeated Stress** (page 75); **Tension Testing** (page 93); **Torsion Testing** (page 102); **Transverse Testing** (page 103); **Wearing Properties** (page 106).

(Reports and papers on testing specific materials are indexed under the names of those materials.)

Testing Apparatus 95
See also **Testing, Methods of** (page 96).

Testing Laboratories.
See **Laboratories** (page 58).

Testing Machines.
See **Testing Apparatus** (page 95).

Testing, Methods of 96
See also note under **Testing.**

Textile Materials 99

Thermal Expansion 100

Thinners, Paint.
See **Paints** (page 67).

Tie Plates 100

Tile.
See **Building Tile** (page 33); **Drain Tile** (page 48).

Timber 101

Tin 102
See also **Alloys** (page 22).

Tool Steel 102

Tools 102

Torsion Testing 102

Toughness 103
See also **Hardness** (page 53); **Impact Testing** (page 56); **Wearing Properties** (page 106).

Track Bolts 103

Track Spikes 103
See also **Screw Spikes** (page 81).

Transverse Fissures 103

Transverse Testing 103

Tubes 104

Tung Oil 104

Turpentine 104

V

Vanadium Steel 105

Varnish 105

Vehicles, Paint.
See **Paints** (page 67).

PAGE

Viscosity 105
See also **Consistency** (page 44); **Penetration** (page 68); **Plastic Deformation** (page 69); **Softening Point** (page 84).

Vitrification.
See **Clay Products** (page 37).

W

Walls.
See **Building Tile** (page 33); **Pressures** (page 72).

Waterproofing 106

Waxes 106

Wearing Properties 106
See also **Hardness** (page 53); **Impact Testing** (page 56); **Toughness** (page 103).

Weathering Tests 107

Welding 107

Wheels 107

Wire 107
See also **Copper Wire** (page 46).

Wood.
See **Timber** (page 101).

Wrought Iron 108

Y

Yellow Pine 109
See also **Timber** (page 101).

Yield Point 109
See also **Elastic Limit** (page 49).

Z

Zinc 109
See also **Alloys** (page 22).

SUBJECT INDEX.

A

ABRASION.

See also **Wearing Properties** (page 106).

"An Abrasion Test for Stone, Gravel and Similar Aggregates." H. H. Scofield. XVIII, Part II, 416 (1918). Discussion, 426.

"The Standard Deval Abrasion Test for Rock." F. H. Jackson. XX, Part II, 278 (1920). Discussion, 291.

ABSORPTION.

See also **Brick** (page 31); **Drain Tile** (page 48); **Sewer Pipe** (page 82).

Absorption Tests of Tile. XVII, Part I, 338 (1917).

Proposed Provisional Test for the Determination of the Absorption of Water per Cubic Foot of Rock. XIV, Part I, 379 (1914).

"The Specific Gravity of Non-Homogeneous Aggregates." Prévost Hubbard and F. H. Jackson, Jr. XVI, Part II, 378 (1916). Discussion, 402.

ADDRESSES.

"The Application of Specifications." Address by the President, Robert W. Hunt, at the Sixteenth Annual Meeting. XIII, 32 (1913).

"The Relation between Research and the Activities of the Society." Address by the President, A. N. Talbot, at the Seventeenth Annual Meeting. XIV, Part I, 31 (1914).

"Our Rail Specifications." Address by the President, A. W. Gibbs, at the Eighteenth Annual Meeting. XV, Part I, 32 (1915).

"The Work of Committees." Address by the President Mansfield Merriman at the Nineteenth Annual Meeting. XVI, Part I, 34 (1916).

"Our Society." Address by the President, A. A. Stevenson, at the Twentieth Annual Meeting. XVII, Part I, 34 (1917).

Address by Past-President A. W. Gibbs, at the Twentieth Annual Meeting. XVII, Part I, 50 (1917).

Address by Past-President A. N. Talbot, at the Twentieth Annual Meeting. XVII, Part I, 51 (1917).

Address by Past-President R. W. Hunt, at the Twentieth Annual Meeting. XVII, Part I, 52 (1917).

Address by Past-President H. M. Howe, at the Twentieth Annual Meeting. XVII, Part I, 54 (1917).

Address by Past-President Mansfield Merriman, at the Twentieth Annual Meeting. XVII, Part I, 55 (1917).

"Engineering Societies: Their Utilities and Justification." Address by the President, William H. Bixby, at the Twenty-first Annual Meeting. XVIII, Part I, 52 (1918).

Addresses delivered at the Memorial Session in Honor of the Memory of Edgar Marburg: XIX, Part I, 41–57 (1919): Introductory Remarks, G. H. Clamer, 41; "Contributions to Engineering," J. M. Goodell, 43; "His Early Activities in the Society," R. W. Lesley, 47; "His More Recent Service in the Society," A. N. Talbot, 52; "A Personal Tribute," Robert W. Hunt, 55; Closing Remarks by the Chairman, A. A. Stevenson, 57.

"Standardization." Address by the President, G. H. Clamer, at the Twenty-second Annual Meeting. XIX, Part I, 80 (1919).

Address by the President, J. A. Capp, at the Twenty-third Annual Meeting. XX, Part I, 30 (1920).

AGGREGATES.

See also **Sand** (page 80); **Stone** (page 92).

Abrams-Harder Field Test for Organic Impurities in Sand. XIX, Part I, 321 (1919).

"An Abrasion Test for Stone, Gravel and Similar Aggregates." H. H. Scofield. XVIII, Part II, 416 (1918). Discussion, 426.

"A New Form of Specifications for Concrete Aggregates." C. M. Chapman. XVI, Part II, 180 (1916). Discussion, 188.

"Apparent Specific Gravity of Non-Homogeneous Fine Aggregates." A. S. Rea. XVII, Part II, 256 (1917).

"Blast-Furnace Slag as Aggregate in Concrete." W. A. Aiken. XIV, Part II, 280 (1914). Discussion, 288.

"Economical Proportions for Portland-Cement Mortars and Concretes." J. A. Kitts. XVII, Part II, 279 (1917). Discussion, 295.

"Effect of Controllable Variables on the Toughness Test for Rock." F. H. Jackson, Jr. XVII, Part II, 571 (1917). Discussion, 586.

"Effects of Grading of Sands and Consistency of Mix upon the Strength of Plain and Reinforced Concrete." L. N. Edwards. XVII, Part II, 301 (1917). Discussion, 358. XVIII, Part II, 303 (1918).

"Effect of Tannic Acid on the Strength of Concrete." D. A. Abrams. XX, Part I, 309 (1920).

"Impact Test on Concrete to Regulate Coarse and Fine Aggregate Qualities and Mixes for Highways." H. S. Mattimore. XX, Part II, 266 (1920). Discussion, 277.

"Observations on the Testing of Sand." W. B. Reinke. XIII, 797 (1913). Discussion, 807.

Outline of Compression Tests of Concrete for Investigation of Properties of Concrete Mixtures. XX, Part I, 294 (1920).

"Proportioning Aggregates for Portland-Cement Concrete." Albert Moyer. XIV, Part II, 255 (1914). Discussion, 267.

"Proportioning of Pit-Run Gravel for Concrete." R. W. Crum. XIX, Part II, 458 (1919). Discussion, 476.

"Proportioning the Materials of Mortars and Concretes by Surface Areas of Aggregates." L. N. Edwards. XVIII, Part II, 235 (1918). Discussion, 284.

"Proportions and Quantities of Materials for Concrete for Highway Construction." D. A. Abrams. XX, Part I, 437 (1920).

Proposed Provisional Method for:

Making a Mechanical Analysis of Broken Stone or Broken Slag. XIV, Part I, 381 (1914).

Making a Mechanical Analysis of Mixtures of Sand or Other Fine Material with Broken Stone or Broken Slag. XIV, Part I, 382 (1914).

Report on weight, voids, density, specific gravity and consistency of concrete and concrete aggregates. XX, Part I, 340 (1920).

Sand specifications. XVII, Part II, 353 (1917).

"Some Theoretical Studies on Proportioning Concrete by the Method of Surface Area of Aggregates." R. B. Young. XIX, Part II, 444 (1919). Discussion, 476.

Suggested Colorimetric Tests for Organic Impurities in Sand. XVII, Part I, 327 (1917).

Tentative Methods for:

Determination of Voids in Fine Aggregate for Cement Concrete. XX, Part I, 652 (1920).

Form of Specifications for Certain Commercial Grades of Broken Stone. XVI, Part I, 548 (1916); XVII, Part I, 810 (1917).

AGGREGATES (*Continued*).

Tentative Method for (*Continued*):

Sampling of Stone, Slag, Gravel, Sand and Stone Block for Use as Highway Materials, Including Some Material Survey Methods. XX, Part I, 789 (1920).

Tentative Specifications for:

Commercial Sizes of Broken Stone and Broken Slag for Highway Construction. XX, Part I, 693 (1920).

Commercial Sizes of Sand and Gravel for Highway Construction. XX, Part I, 696 (1920).

Tentative Tests for:

Determination of Apparent Specific Gravity of Coarse Aggregates. XVII, Part I, 776 (1917).

Determination of Apparent Specific Gravity of Homogeneous Coarse Aggregates. XVI, Part I, 529 (1916).

Determination of Apparent Specific Gravity of Sand, Stone and Slag Screenings, and Other Fine Non-Bituminous Highway Materials. XVIII, Part I, 689 (1918).

Quantity of Clay and Silt in Gravel for Highway Construction, XX, Part I, 770 (1920).

Quantity of Clay and Silt in Sand for Highway Construction. XX, Part I, 774 (1920).

Quantity of Clay in Sand-Clay, Topsoil, and Semi-Gravel for Highway Construction. XX, Part I, 772 (1920).

Unit Weight of Aggregate for Cement Concrete. XX, Part I, 624 (1920).

"Testing Concrete Aggregates." C. M. Chapman. XIV, Part II, 298 (1914). Discussion, 304.

"Tests of Concrete Road Aggregates." J. P. Nash. XVII, Part II, 394 (1917). Discussion, 417.

"Tests of Mortars Made from Wisconsin Aggregates." M. O. Withey. XIII, 834 (1913).

"Tests of Natural Concrete Aggregates." R. S. Greenman. XIII, 828 (1913).

"The Microstructure of Concretes." N. C. Johnson. XV, Part II, 171 (1915). Discussion, 214.

"The Sampling of Deposits of Road Stone and Gravel in the Field." L. Reinecke and K. A. Clark. XVIII, Part II, 393 (1918). Discussion, 414.

"The Specific Gravity of Non-Homogeneous Aggregates." Prévost Hubbard and F. H. Jackson, Jr. XVI, Part II, 378 (1916). Discussion, 402.

"The Standard Deval Abrasion Test for Rock." F. H. Jackson. XX, Part II, 278 (1920). Discussion, 291.

"The Volume-Moisture Relation in Sand and a Method of Determining Surface Area Based Thereon." R. B. Young and W. D. Walcott. XX, Part II, 137 (1920).

"Weight-Volumetric Proportioning of Concrete Aggregates in Testing." J. A. Kitts. XV, Part II, 153 (1915). Discussion, 161.

AIR-LINE HOSE.

See **Hose** (page 55).

AIRPLANE.

"Transverse Testing under Non-Uniformly Distributed Load with Special Application to Airplane Wing Ribs." I. H. Cowdrey. XVIII, Part II, 429 (1918).

ALLOY STEELS.

See also **Steel, Reports of Committee** (page 89).

Effect of silicon on magnetic properties. XVII, Part II, 17 (1917).

"Effect of Size of Section on Physical Properties Developed by Heat Treatment." J. H. Nead. XIII, 489 (1913). Discussion, 525.

ALLOY STEELS (*Continued*).

"Magnetic Habits of Alloy Steels." J. A. Mathews. XIV, Part II, 50 (1914). Discussion, 67.

Magnetic testing of alloy steels. XIX, Part II, 25 (1919).

"Modern High Speed Steel." J. A. Mathews. XIX, Part II, 141 (1919). Discussion, 157.

"Molybdenum as an Alloying Element in Structural Steels." G. W. Sargent. XX, Part II, 5 (1920). Discussion, 29.

"Some Fatigue Tests of Nickel Steel and Chrome-Nickel Steel." H. F. Moore and A. G. Gehrig. XIX, Part II, 206 (1919). Discussion, 219.

Tentative Revisions of Standard Specifications for:

Automobile Carbon and Alloy Steels. XX, Part I, 812 (1920).

Quenched Alloy-Steel Track Bolts. XX, Part I, 810 (1920).

"The Charpy Impact Test on Heat-Treated Steels." J. J. Thomas. XV, Part II, 62 (1915).

"The Relation Between Maximum Strength, Brinell Hardness and Scleroscope Hardness in Treated and Untreated Alloy and Plain Steels." R. R. Abbott. XV, Part II, 42 (1915). Discussion, 60.

"The Single Blow Notched Bar Impact Test as Used in the American Industry." E. H. Dix, Jr. XIX, Part II, 720 (1919). Discussion, 756.

Topical Discussion on Magnetic Analysis:

"A Systematic Investigation of the Correlation of the Magnetic and Mechanical Properties of Steel." N. J. Gebert. XIX, Part II, 117 (1919). Discussion, 136.

"Magnetic Analysis as a Criterion of the Quality of Steel and Steel Products." C. W. Burrows and F. P. Fahy. XIX, Part II, 5 (1919). Discussion, 136.

Topical Discussion on the Rôle of the Several Alloying Elements in the Alloy Steels:

"The Rôle of Chrome Vanadium." F. J. Griffiths. XVII, Part II, 33 (1917). Discussion, 55.

"The Rôle of Manganese." H. M. Howe. XVII, Part II, 5 (1917). Discussion, 45.

"The Rôle of Nickel." R. R. Abbott. XVII, Part II, 9 (1917). Discussion, 45.

"The Rôle of Silicon." W. E. Ruder. XVII, Part II, 15 (1917). Discussion, 45.

"The Rôle of Vanadium." G. L. Norris. XVII, Part II, 20 (1917). Discussion, 47.

ALLOYS.

"Aluminum Bronze: Some Recent Tests and Their Significance." W. M. Corse and G. F. Comstock. XVI, Part II, 117 (1916). Discussion, 145.

"A Note on the Constitution of Certain Tin-Bearing Brasses." William Campbell. XX, Part II, 104 (1920).

"An Investigation Leading to Specifications for Brass Condenser Tubes." A. E. White. XVI, Part II, 151 (1916). Discussion, 168.

A Review of the Tin Situation. XVI, Part I, 187 (1916).

"A Simple Type of Brinell Testing Machine for 500-kg. Load." A. V. de Forest. XVIII, Part II, 449 (1918). Discussion, 466.

"Battery Zincs: Some Causes of Defective Service." Robert Job and F. F. White. XV, Part II, 112 (1915). Discussion, 116.

Classification of American copper. XIII, 206 (1913).

"Considerations Affecting Specifications for Wrought Non-Ferrous Materials." W. Reuben Webster. XIV, Part II, 127 (1914). Discussion, 141.

Determination of Manganese in Manganese Bronze. XVIII, Part I, 256 (1918).

ALLOYS (*Continued*).

"Development of Brinell Hardness Tests on Thin Brass Sheet." S. L. Goodale and R. M. Banks. XIX, Part II, 757 (1919).

Discussion on nomenclature of non-ferrous metals and alloys. XX, Part I, 245 (1920).

Discussion on non-ferrous metals and alloys. XV, Part I, 139 (1915).

Discussion on sand-cast alloys for steam service. XVI, Part I, 193 (1916).

Discussion on specifications for Babbitt metals. XVIII, Part I, 262 (1918).

"Electrolytic Determination of Tin on Tinned Copper Wire." G. G. Grower. XVII, Part II, 129 (1917). Discussion, 153.

"Fatigue and Impact Fatigue Tests of Aluminum Alloys." W. A. Gibson. XX, Part II, 115 (1920). Discussion, 133.

"Fatigue of Copper Alloys." Ernst Jonson. XV, Part II, 101 (1915). Discussion, 109.

"Hardness of Hard-Drawn Copper." E. H. Peirce. XVII, Part II, 114 (1917). Discussion, 122.

"Inspection of Brass and Bronze." A. D. Flinn and Ernst Jonson. XVII, Part II, 212 (1917). Discussion, 224.

"Interior Surface Defects on Brass Condenser Tubes as a Cause of Corrosion." W. Reuben Webster. XVII, Part II, 204 (1917).

"Lead-Tin-Antimony and Tin-Antimony-Copper Alloys." William Campbell. XIII, 630 (1913). Discussion, 666.

"Light *versus* Heavy Reductions in Cold Working Brass." W. Reuben Webster. XVII, Part II, 156 (1917). Discussion, 162.

Nomenclature of non-ferrous alloys. XX, Part I, 239 (1920).

Properties of 10-per-cent Aluminum Bronze. XVII, Part I, 190 (1917).

Properties of Manganese Bronze. XVII, Part I, 186 (1917).

Properties of the Alloy: Aluminum, 92 per cent; Copper, 8 per cent. XVII, Part I, 191 (1917).

Properties of the Alloy: Copper, 80 per cent; Tin, 10 per cent; Lead, 10 per cent. XVII, Part I, 188 (1917).

Properties of the Alloy: Copper, 88 per cent; Tin, 10 per cent; Zinc, 2 per cent. XVII, Part I, 182 (1917).

Resistance to corrosion of aluminum alloys in the salt spray test. XIX, Part I, 586 (1919).

Results of tests on white metal alloys. XIII, 211 (1913).

"Some Experiments on the Plastic Elongation of Wire." A. V. de Forest. XVI, Part II, 455 (1916). Discussion, 465.

"Some Tests of Light Aluminum Casting Alloys: The Effect of Heat Treatment." P. D. Merica and C. P. Karr. XIX, Part II, 297 (1919).

Spelter: Its Grades and Uses. XVI, Part I, 183 (1916).

Standard Specifications for:

Electrolytic Copper Wire Bars, Cakes, Slabs, Billets, Ingots, and Ingot Bars. XIII, 218 (1913).

Lake Copper Wire Bars, Cakes, Slabs, Billets, Ingots, and Ingot Bars. XIII, 214 (1913).

"Strength of Cast Zinc or Spelter." Gilbert Rigg and G. M. Williams. XIII, 669 (1913). Discussion, 698.

"Study of the Strength of Non-Ferrous Castings: Comparison of Different Test Specimens." L. P. Webbert. XIV, Part II, 145 (1914). Discussion, 159.

Tentative Methods for:

Battery Assay of Copper. XIX, Part I, 517 (1919).

Chemical Analysis of Alloys of Lead, Tin, Antimony and Copper. XVII, Part I, 622 (1917); XVIII, Part I, 502 (1918); XIX, Part I, 509 (1919); XX, Part I, 589 (1920).

ALLOYS (*Continued*).
Tentative Methods for (*Continued*):
Chemical Analysis of Gun Metal. XVIII, Part I, 523 (1918).
Chemical Analysis of Manganese Bronze. XVIII, Part I, 510 (1918).
Chemical Analysis of Pig Lead. XIX, Part I, 523 (1919).
Tentative Revisions of Standard Specifications for:
Copper Bars for Locomotive Staybolts. XX, Part I, 816 (1920).
Spelter. XVI, Part I, 583 (1916); XX, Part I, 816 (1920).
Tentative Specifications for:
Aluminum for Use in the Manufacture of Iron and Steel. XX, Part I, 586 (1920).
Aluminum Ingots for Remelting and for Rolling. XVIII, Part I, 492 (1918); XIX, Part I, 473 (1919); XX, Part I, 543 (1920).
Aluminum Sheet. XVIII, Part I, 494 (1918); XIX, Part I, 475 (1919); XX, Part I, 546 (1920).
Brass Forging Rod. XVII, Part I, 603 (1917).
Brass Ingot Metal for Sand Castings. XIX, Part I, 490 (1919; XX, Part I, 561 (1920).
Bronze Bearing Metal in Ingot Form. XIX, Part I, 494 (1919); XX, Part I, 565 (1920).
Bronze Bearing Metals for Turntables and Movable Railroad Bridges. XVIII, Part I, 482 (1918); XIX, Part I, 463 (1919); XX, Part I, 533 (1920).
Cartridge Brass. XVIII, Part I, 472 (1918).
Cartridge Brass Disks. XVIII, Part I, 476 (1918).
Copper Bars for Locomotive Staybolts. XVI, Part I, 441 (1916); XVII, Part I, 592 (1917).
Copper Plates for Locomotive Fireboxes. XVI, Part I, 437 (1916); XVII, Part I, 588 (1917).
Free-Cutting Brass Rod for Use in Screw Machines. XVII, Part I, 606 (1917).
Lead. XIX, Part I, 483 (1919).
Light Aluminum Casting Alloys. XVIII, Part I, 497 (1918): XIX, Part I, 478 (1919); XX, Part I, 549 (1920).
Naval Brass Rods for Structural Purposes. XVIII, Part I, 478 (1918).
Non-Ferrous Alloys for Railway Equipment in Ingots, Castings, and Finished Car and Tender Bearings. XVII, Part I, 610 (1917); XVIII, Part I, 467 (1918); XIX, Part I, 458 (1919); XX, Part I, 528 (1920).
Pig Lead. XX, Part I, 554 (1920).
Seamless Brass Boiler Tubes. XVI, Part I, 448 (1916); XVII, Part I, 599 (1917).
Seamless Copper Boiler Tubes. XVI, Part I, 444 (1916); XVII, Part I, 595 (1917).
Sheet High Brass. XX, Part I, 580 (1920).
Solder Metal. XIX, Part I, 498 (1919): XX, Part I, 569 (1920).
Spelter. XVII, Part I, 615 (1917).
The Alloy: Copper, 88 per cent; Tin, 10 per cent; Zinc, 2 per cent. XVI, Part I, 434 (1916); XVII, Part I, 585 (1917).
White Metal Bearing Alloys (Known Commercially as "Babbitt Metal"). XVIII, Part I, 487 (1918): XIX, Part I, 468 (1919); XX, Part I, 538 (1920).
"Testing of Sheet Brass." C. H. Davis. XVII, Part II, 164 (1917). Discussion, 199.

ALLOYS (*Continued*).

"The Behavior of Wrought Manganese Bronze Exposed to Corrosion While Under Tensile Stress." P. D. Merica and R. W. Woodward. XIX, Part II, 278 (1919). Discussion, 289.

The Difficulty of Issuing Figures on Sand-Cast Alloys. XVI, Part I, 191 (1916).

"The Evaluation of Zinc Dust: A Proposed Method of Analysis." L. A. Wilson. XVIII, Part II, 220 (1918).

Topical Discussion on Season and Corrosion Cracking of Brass:

"Initial Stress and Corrosion Cracking." P. D. Merica and R. W. Woodward. XVIII, Part II, 165 (1918). Discussion, 201.

"Season Cracking." W. Reuben Webster. XVIII, Part II, 163 (1918). Discussion, 201.

"Season Cracking and Splitting of Condenser Tubes and Pipes." William Campbell. XVIII, Part II, 147 (1918). Discussion, 201.

"The Causes and Prevention of Corrosion Cracking." W. H. Bassett. XVIII, Part II, 153 (1918). Discussion, 201.

"The Prevention of Season and Corrosion Cracking of Brass Artillery Cases by Special Heat Treatment." W. B. Price. XVIII, Part II, 179 (1918). Discussion, 201.

"The Use of Mercury Solutions for Predicting Season Cracking in Brass." H. S. Rawdon. XVIII, Part II, 189 (1918). Discussion, 201.

ALLOYS, REPORTS OF COMMITTEE.

Reports of the Committee on Non-Ferrous Metals and Alloys:

Recommending for adoption specifications for: lake copper wire bars, cakes, slabs, billets, ingots and ingot bars; electrolytic copper wire bars, cakes, slabs, billets, ingots and ingot bars. Giving classification of American copper and results of tests on white metals. XIII, 206 (1913).

Recommending for adoption revisions in Standard Specifications for: Spelter; Manganese-Bronze Ingots. XIV, Part I, 178 (1914). Discussion, 181.

Submitting as tentative specifications for the alloy: copper, 88 per cent, tin, 10 per cent, zinc, 2 per cent. XV, Part I, 137 (1915). Discussion, 139.

Submitting revisions in Standard Specifications for: Spelter. Submitting as tentative specifications for: copper plates for locomotive fireboxes; copper bars for locomotive staybolts; seamless copper boiler tubes; seamless brass boiler tubes. Transmitting appendices on: "Spelter: Its Grades and Uses"; "A Review of the Tin Situation"; "The Difficulty of Issuing Figures on Sand-Cast Alloys." XVI, Part I, 180 (1916). Discussion, 193.

Submitting as tentative specifications for: spelter; brass forging rod; free-cutting brass rod for use in screw machines; non-ferrous alloys for railway equipment in ingots, castings and finished car and tender bearings; and methods for chemical analysis of alloys of lead, tin, antimony and copper. Transmitting report of sub-committee on sand-cast metals and alloys. XVII, Part I, 178 (1917). Addendum, 195.

Recommending for adoption as standard specifications for: spelter; brass forging rod; free-cutting brass rod for use in screw machines; the alloy: copper, 88 per cent, tin, 10 per cent, zinc, 2 per cent; copper plates for locomotive fireboxes; copper bars for locomotive staybolts; seamless copper boiler tubes; seamless brass boiler tubes. Submitting as tentative specifications for: cartridge brass; cartridge brass disks; naval brass rods for structural purposes; bronze bearing metals for turntables; white bearing alloys (Babbitt metals); aluminum ingots for remelting and for rolling; aluminum sheet; light aluminum casting alloys; methods for chemical analysis of manganese bronze; methods for chemical analysis of gun metal. Transmitting appendix on determination of manganese in manganese bronze. XVIII, Part I, 246 (1918). Addendum, 260. Discussion, 262.

ALLOYS, REPORTS OF COMMITTEE (*Continued*).

Reports of the Committee on Non-Ferrous Metals and Alloys (*Continued*):

Recommending for adoption as standard specifications for: cartridge brass; cartridge brass disks; naval brass rods for structural purposes; and methods for chemical analysis of gun metal; methods for chemical analysis of manganese bronze. Submitting as tentative specifications for: brass ingot metal for sand castings; bronze bearing metal in ingot form; solder metal; lead; and methods for battery assay of copper; methods for chemical analysis of pig lead. Submitting revisions of the Tentative Specifications for: Aluminum Ingots for Remelting and for Rolling; Aluminum Sheet; Light Aluminum Casting Alloys. XIX, Part I, 253 (1919). Discussion, 259.

Submitting revisions of the Standard Specifications for: Copper Bars for Locomotive Staybolts; Spelter. Submitting revisions of the Tentative Specifications for: Lead; Aluminum Ingots for Remelting and for Rolling; and Methods for Chemical Analysis of Alloys of Lead, Tin, Antimony and Copper. Submitting as tentative specifications for: sheet high brass; aluminum for use in the manufacture of iron and steel. Recommending for adoption as standard methods for battery assay of copper; methods for chemical analysis of pig lead. Transmitting a proposed scheme of nomenclature of non-ferrous alloys. XX, Part I, 234 (1920). Discussion, 245.

ALTERNATING STRESS.

"A High-Speed Alternating Torsion Testing Machine." D. J. McAdam, Jr. XX, Part II, 366 (1920). Discussion, 371.

"Aluminum Bronze: Some Recent Tests and Their Significance." W. M. Corse and G. F. Comstock. XVI, Part II, 117 (1916). Discussion, 145.

"An Alternating Torsion Testing Machine." D. J. McAdam, Jr. XVII, Part II, 599 (1917).

"Are the Effects of Simple Overstrain Monotropic?" H. M. Howe. XIV, Part II, 7 (1914). Discussion, 36.

"Constants and Diagrams for Repeated Stress Calculations." H. F. Moore and F. B. Seely. XVI, Part II, 470 (1916).

Discussion on repeated stress. XV, Part II, 463 (1915).

"Endurance and Impact Tests of Metals." D. J. McAdam, Jr. XVI, Part II, 292 (1916). Discussion, 307.

"Fatigue and Impact Fatigue Tests of Aluminum Alloys." W. A. Gibson. XX, Part II, 115 (1920). Discussion, 133.

"Fatigue Testing Machine." F. M. Farmer. XIX, Part II, 709 (1919). Discussion, 717.

"Recrystallization as a Factor in the Failure of Boiler Tubes." A. E. White and H. F. Wood. XVI, Part II, 80 (1916). Discussion, 111.

"Some Fatigue Tests of Nickel Steel and Chrome-Nickel Steel." H. F. Moore and A. G. Gehrig. XIX, Part II, 206 (1919). Discussion, 219.

"Some Tests of Light Aluminum Casting Alloys: The Effect of Heat Treatment." P. D. Merica and C. P. Karr. XIX, Part II, 297 (1919).

"The Failure of Materials Under Repeated Stress." H. F. Moore and F. B. Seely. XV, Part II, 437 (1915). Discussion, 463.

ALUMINA.

"Cements Producing Quick-Hardening Concrete." P. H. Bates. XIX, Part II, 425 (1919). Discussion, 439.

"Testing of Refractories." A. V. Bleininger. XIII, 967 (1913).

ALUMINUM.

See also **Alloys** (page 22).

"Aluminum Bronze: Some Recent Tests and Their Significance." W. M. Corse and G. F. Comstock. XVI, Part II, 117 (1916). Discussion, 145.

ALUMINUM (*Continued*).

"Fatigue and Impact Fatigue Tests of Aluminum Alloys." W. A. Gibson, XX, Part II, 115 (1920). Discussion, 133.

Properties of 10-per-cent Aluminum Bronze. XVII, Part I, 190 (1917).

Properties of the Alloy: Aluminum, 92 per cent; Copper, 8 per cent. XVII, Part I, 191 (1917).

Resistance to corrosion of aluminum alloys in the salt spray test. XIX, Part II, 320 (1919).

"Some Tests of Light Aluminum Casting Alloys: The Effect of Heat Treatment." P. D. Merica and C. P. Karr. XIX, Part II, 297 (1919).

Tentative Specifications for:

Aluminum for Use in the Manufacture of Iron and Steel. XX, Part I, 586 (1920).

Aluminum Ingots for Remelting and for Rolling. XVIII, Part I, 492 (1918); XIX, Part I, 473 (1919); XX, Part I, 543 (1920).

Aluminum Sheet. XVIII, Part I, 494 (1918); XIX, Part I, 475 (1919); XX, Part I, 546 (1920).

Light Aluminum Casting Alloys. XVIII, Part I, 497 (1918); XIX, Part I, 478 (1919); XX, Part I, 549 (1920).

ANALYSES.

(Methods of analyses are indexed under the subjects covered by them.)

ANNEALING.

See **Heat Treatment** (page 54).

ANTIMONY.

See also **Alloys** (page 22).

Discussion on sand-cast alloys for steam service. XVI, Part I, 193 (1916).

"Lead-Tin-Antimony and Tin-Antimony-Copper Alloys." William Campbell. XIII, 630 (1913). Discussion, 666.

Results of tests on alloys. XIII, 211 (1913).

Tentative Methods for Chemical Analysis of Alloys of Lead, Tin, Antimony and Copper. XVII, Part I, 622 (1917); XVIII, Part I, 502 (1918); XIX, Part I, 509 (1919); XX, Part I, 589 (1920).

Tentative Specifications for White Metal Bearing Alloys (Known Commercially as "Babbitt Metal"). XVIII, Part I, 487 (1918); XIX, Part I, 468 (1919); XX, Part I, 538 (1920).

APPARATUS.

See **Testing Apparatus** (page 95).

ASH.

See **Coal** (page 38); **Coke** (page 39).

ASPHALT.

See **Bituminous Materials** (page 29).

AUTOMOBILE STEELS.

See **Steel** (page 87).

AXLES.

See also **Steel, Reports of Committee** (page 89).

"A Failed Axle: Study of an Internal Transverse Fissure." Robert Job. XIV, Part II, 76 (1914). Discussion, 84.

Calculation of Energy Expended in Bending a Beam. XVII, Part I, 115 (1917).

"Heat Treatment of Carbon-Steel Locomotive Axles: Water *vs.* Oil Quenching." C. D. Young. XVI, Part II, 53 (1916). Discussion, 65.

Standard Specifications for Cold-Rolled Steel Axles. XIII, 156 (1913).

B

BABBITT METAL.

See also **Alloys** (page 22).

Discussion on specifications for Babbitt metals. XVIII, Part I, 262 (1918).

Results of tests on white metal alloys. XIII, 211 (1913).

Tentative Specifications for White Metal Bearing Alloys (Known Commercially as "Babbitt Metal"). XVIII, Part I, 487 (1918); XIX, Part I, 468 (1919); XX, Part I, 538 (1920).

BARS.

See also **Reinforcement Bars** (page 75); **Splice Bars** (page 86).

Standard Specifications for:

Electrolytic Copper Wire Bars, Cakes, Slabs, Billets, Ingots and Ingot Bars. XIII, 218 (1913).

Lake Copper Wire Bars, Cakes, Slabs, Billets, Ingots and Ingot Bars. XIII, 214 (1913).

Tentative Specifications for:

Commercial Bar Steels. XX, Part I, 518 (1920).

Extra Refined Wrought-Iron Bars. XIX, Part I, 454 (1919); XX, Part I, 522 (1920).

BEAMS.

Calculation of Energy Expended in Bending a Beam. XVII, Part I, 115 (1917).

"Relation between Deformation and Deflection in Reinforced-Concrete Beams." G. A. Maney. XIV, Part II, 310 (1914).

Report on Design of Reinforced Gypsum Beams. XIX, Part I, 348 (1919).

BEARINGS.

Discussion on specifications for Babbitt metals. XVIII, Part I, 262 (1918).

"Lead-Tin-Antimony and Tin-Antimony Copper Alloys." William Campbell. XIII, 630 (1913). Discussion, 666.

"Spherical Bearings." Mont Schuyler. XIII, 1004 (1913).

"Study of Bearing Metals and Methods of Testing." T. D. Lynch. XIII, 699 (1913). Discussion, 712.

Tentative Specifications for:

Bronze Bearing Metal in Ingot Form. XIX, Part I, 494 (1919); XX, Part I, 565 (1920).

Bronze Bearing Metals for Turntables and Movable Railroad Bridges. XVIII, Part I, 482 (1918); XIX, Part I, 463 (1919); XX, Part I, 533 (1920).

Non-Ferrous Alloys for Railway Equipment in Ingots, Castings, and Finished Car and Tender Bearings. XVII, Part I, 610 (1917); XVIII, Part I, 467 (1918); XIX, Part I, 458 (1919); XX, Part I, 528 (1920).

White Metal Bearing Alloys (Known Commercially as "Babbitt Metal"). XVIII, Part I, 487 (1918); XIX, Part I, 468 (1919); XX, Part I, 538 (1920).

Topical Discussion on Magnetic Analysis:

"Application of Magnetic Analysis to the Testing of Ball Bearing Races." R. L. Sanford and M. F. Fischer. XIX, Part II, 68 (1919). Discussion, 136.

BELTING.

"An Autographic Friction Testing Machine for Testing Mechanical Rubber Goods." J. M. Bierer. XIV, Part II, 627 (1914). Discussion, 634.

"Rubber Belting and Methods of Testing." W. E. Campbell. XIV, Part II, 617 (1914). Discussion, 624.

Tentative Specifications for Rubber Belting for Power Transmission. XVIII, Part I, 676 (1918); XIX, Part I, 715 (1919).

BELTING (*Continued*).

Tentative Tests for Cotton Fabrics for Use in Hose, Belting, and Similar Articles. XVI, Part I, 533 (1916); XVII, Part II, 793 (1917).

BESSEMER.

See **Steel** (page 87).

BITUMINOUS MATERIALS.

See also **Oils** (page 65); **Road Materials** (page 76).

"A New Consistency Tester for Viscous Liquid Bituminous Materials." Prévost Hubbard and F. P. Pritchard. XVII, Part II, 603 (1917). Discussion, 621.

"Apparatus for Determination of Breaking Point of Pitches." H. E. Lloyd and P. P. Sharples. XIX, Part II, 782 (1919). Discussion, 790.

"Coal-Tar and Asphalt Products for Waterproofing." S. T. Wagner. XIII, 955 (1913). Discussion, 959.

Effect of exposure of pavements to illuminating gas. XV, Part II, 282 (1915).

"Extractor for Bituminous Paving Mixtures." C. N. Forrest. XIII, 1069 (1913).

"Method for Studying the Effects of Temperature upon the Physical Condition of Asphalts, Waxes, Etc." J. A. Capp and F. A. Hull. XVII, Part II, 627 (1917). Discussion, 635.

"Methods for Determining the Melting Points of Asphalts." J. G. Miller and P. P. Sharples. XIV, Part II, 502 (1914).

Proposed Test for Penetration of Bituminous Materials. XV, Part I, 352 (1915).

Report of Collaborative Tests of Sectional Committee on Penetration Relative to Modification of the Standard Needle. XX, Part I, 435 (1920).

Report on British standard nomenclature of bituminous materials. XVII, Part I, 476 (1917).

Report on distillation of bituminous materials suitable for road treatment. XVI, Part I, 302 (1916).

Report on ductility tests of bitumen. XV, Part I, 349 (1915).

Report on penetration of bituminous materials. XV, Part I, 352 (1915); XVI, Part I, 306 (1916).

Report on softening point determination of bituminous materials (Ring-and-Ball and Cube Methods). XV, Part I, 341 (1915).

"Some Experiments on Technical Bitumens." S. R. Church and J. M. Weiss. XV, Part II, 274 (1915). Discussion, 294.

"Some Relations between the Characteristics of Steam-Distilled Petroleum Residuals." B. A. Anderton. XX, Part II, 298 (1920). Discussion, 312.

Tentative Methods for:

Determination of Softening Point of Bituminous Materials Other than Tar Products. XVI, Part I, 549 (1916); XVII, Part I, 811 (1917); XVIII, Part I, 707 (1918).

Determination of Softening Point of Tar Products (Cube-in-Water Method). XIX, Part I, 764 (1919).

Tentative Revisions of Standard Methods for Distillation of Bituminous Materials Suitable for Road Treatment. XVII, Part I, 474 (1917).

Tentative Specifications for:

Asphalt for Use in Damp-proofing and Waterproofing. XVII, Part I, 712 (1917); XVIII, Part I, 630 (1918); XIX, Part I, 669 (1919); XX, Part I, 716 (1920).

Coal-Tar Pitch for use in Damp-proofing and Waterproofing. XVII, Part I, 717 (1917); XVIII, Part I, 635 (1918); XIX, Part I, 674 (1919); XX, Part I, 721 (1920).

BITUMINOUS MATERIALS (*Continued*).

Tentative Specifications for (*Continued*):

Creosote Oil for Priming Coat with Coal-Tar Pitch for Use in Damp-Proofing and Waterproofing. XVII, Part I, 721 (1917); XVIII, Part I, 639 (1918); XIX, Part I, 678 (1919); XX, Part I, 725 (1920).

Primer for Use with Asphalt for Use in Damp-proofing and Waterproofing. XVII, Part I, 716 (1917); XVIII, Part I, 634 (1918); XIX, Part I, 673 (1919); XX, Part I, 720 (1920).

Tentative Tests for:

Loss on Heating of Oil and Asphaltic Compounds. XIX, Part I, 732 (1919).

Specific Gravity of Asphalts and Tar Pitches Sufficiently Solid to be Handled in Fragments. XX, Part I, 767 (1920).

Specific Gravity of Road Oils, Road Tars, Asphalt Cements and Soft Tar Pitches. XX, Part I, 764 (1920).

"The So-Called Asphalt Content of Road Oils." B. A. Anderton and D. G. Taylor. XX, Part II, 314 (1920). Discussion, 320.

BLOOMS, BILLETS AND SLABS.

See **Forgings** (page 51); **Steel** (page 87).

BOILER TUBES.

See **Tubes** (page 104).

BOILERS.

Tentative Revisions of Standard Specifications for Boiler Rivet Steel. XX, Part I, 812 (1920).

Tentative Specifications for Boiler and Firebox Steel for Stationary Service. XVI, Part I, 429 (1916); XVII, Part I, 557 (1917); XVIII, Part I, 449 (1918); XIX, Part I, 433 (1919); XX, Part I, 497 (1920).

BOXES.

See **Shipping Containers** (page 83).

BRASS.

See also **Alloys** (page 22).

"A Note on the Constitution of Certain Tin-Bearing Brasses." William Campbell. XX, Part II, 104 (1920).

"A Simple Type of Brinell Testing Machine for 500-kg. Load." A. V. de Forest. XVIII, Part II, 449 (1918). Discussion, 466.

"An Investigation Leading to Specifications for Brass Condenser Tubes." A. E. White. XVI, Part II, 151 (1916). Discussion, 168.

"Considerations Affecting Specifications for Wrought Non-Ferrous Materials." W. Reuben Webster. XIV, Part II, 127 (1914). Discussion, 141.

Determination of Manganese in Manganese Bronze. XVIII, Part I, 256 (1918).

"Development of Brinell Hardness Tests on Thin Brass Sheet." S. L. Goodale and R. M. Banks. XIX, Part II, 757 (1919).

Discussion on non-ferrous metals and alloys. XV, Part I, 139 (1915).

Discussion on sand-cast alloys for steam service. XVI, Part I, 193 (1916).

"Fatigue of Copper Alloys." Ernst Jonson. XV, Part II, 101 (1915). Discussion, 109.

"Inspection of Brass and Bronze." A. D. Flinn and Ernst Jonson. XVII, Part II, 212 (1917). Discussion, 224.

"Interior Surface Defects on Brass Condenser Tubes as a Cause of Corrosion." W. Reuben Webster. XVII, Part II, 204 (1917).

"Light *Versus* Heavy Reductions in Cold Working Brass." W. Reuben Webster. XVII, Part II, 156 (1917). Discussion, 162.

Nomenclature of non-ferrous alloys. XX, Part I, 239 (1920).

Properties of Manganese Bronze. XVII, Part I, 186 (1917).

BRASS (*Continued*).

Properties of the Alloy: Copper, 88 per cent; Tin, 10 per cent; Zinc, 2 per cent. XVII, Part I, 182 (1917).

"Some Experiments on the Plastic Elongation of Wire." A. V. de Forest. XVI, Part II, 455 (1916). Discussion, 465.

Tentative Specifications for:

Brass Forging Rod. XVII, Part I, 603 (1917).

Brass Ingot Metal for Sand Castings. XIX, Part I, 490 (1919); XX, Part I, 561 (1920).

Cartridge Brass, XVIII, Part I, 472 (1918).

Cartridge Brass Disks. XVIII, Part I, 476 (1918).

Free-Cutting Brass Rod for Use in Screw Machines. XVII, Part I, 606 (1917).

Naval Brass Rods for Structural Purposes. XVIII, Part I, 478 (1918).

Seamless Brass Boiler Tubes. XVI, Part I, 448 (1916); XVII, Part I, 599 (1917).

Sheet High Brass. XX, Part I, 580 (1920).

"Testing of Sheet Brass." C. H. Davis. XVII, Part II, 164 (1917). Discussion, 199.

The Difficulty of Issuing Figures on Sand-Cast Alloys. XVI, Part I, 191 (1916).

Topical Discussion on Season and Corrosion Cracking of Brass:

"Initial Stress and Corrosion Cracking." P. D. Merica and R. W. Woodward. XVIII, Part II, 165 (1918). Discussion, 201.

"Season Cracking." W. Reuben Webster. XVIII, Part II, 163 (1918). Discussion, 201.

"Season Cracking and Splitting of Condenser Tubes and Pipes." William Campbell. XVIII, Part II, 147 (1918). Discussion, 201.

"The Causes and Prevention of Corrosion Cracking." W. H. Bassett. XVIII, Part II, 153 (1918). Discussion, 201.

"The Prevention of Season and Corrosion Cracking of Brass Artillery Cases by Special Heat Treatment." W. B. Price. XVIII, Part II, 179 (1918). Discussion, 201.

"The Use of Mercury Solutions for Predicting Season Cracking in Brass." H. S. Rawdon. XVIII, Part II, 189 (1918). Discussion, 201.

BRICK.

See also **Refractories** (page 73).

"A Study of the Proposed A.S.T.M. Tentative Specifications for Building Brick and a Correlation of Their Requirements with Sodium-Sulfate Treatment and Actual Freezing." Edward Orton, Jr. XIX, Part I, 268 (1919).

"Practical Methods for Testing Refractory Fire Brick." C. E. Nesbitt and M. L. Bell. XVI, Part II, 349 (1916). Discussion, 373.

"Preventable Defects in Refractory Bricks." C. E. Nesbitt and M. L. Bell. XIX, Part II, 619 (1919). Discussion, 630.

Proposed Standard Specifications for:

Building Brick. XIII, 286 (1913).

Paving Brick. XIII, 289 (1913).

Reports of the Committee on Brick:

Submitting proposed Standard Specifications for Building Brick; proposed Standard Specifications for Paving Brick. XIII, 282 (1913). Discussion, 301.

Progress report on the laboratory testing of building brick. XIV, Part I, 188 (1914). Discussion, 191.

Recommending for adoption specifications for: paving brick. Transmitting results of cooperative tests on building brick. XV, Part I, 150 (1915).

BRICK (*Continued*).

Reports of the Committee on Brick (*Continued*):

Submitting as tentative specifications for building brick. Transmitting paper on "A Study of the Proposed A.S.T.M. Tentative Specifications for Building Brick and a Correlation of Their Requirements with Sodium-Sulfate Treatment and Actual Freezing," by Edward Orton, Jr. XIX, Part I, 266 (1919).

Recommending for adoption as standard specifications for building brick. XX, Part I, 262 (1920).

Results of tests on building brick reported by university laboratories. XV, Part I, 152, 160 (1915).

Results of tests to determine relation between compressive strength of bricks crushed on flat and on edge. XV, Part I, 162 (1915).

"Slag Test for Refractory Brick Used in the Iron and Steel Industry." C. E. Nesbitt and M. L. Bell. XVII, Part I, 314 (1917).

"Suggested Improvements in the Manufacture of Silica Brick." C. E. Nesbitt and M. L. Bell. XVII, Part II, 467 (1917). Discussion, 483.

Tentative Specifications for:

Building Brick. XIX, Part I, 537 (1919).

Materials for Cement Grout Filler for Brick and Stone Block Pavement. XIX, Part I, 650 (1919).

Materials for Cement Mortar Bed for Brick, Stone Block and Wood Block Pavement. XIX, Part I, 652 (1919).

Tentative Test for Determination of Softening Point of Fire-Clay Brick. XIX, Part I, 594 (1919).

"The Necessity for Inspection and Testing of Refractory Brick." C. E. Nesbitt and M. L. Bell. XVIII, Part II, 336 (1918). Discussion, 346.

BRIDGES.

See also **Steel, Reports of Committee** (page 89).

Tentative Revisions of Standard Specifications for Structural Steel for Bridges. XX, Part I, 811 (1920).

Tentative Specifications for:

Bronze Bearing Metals for Turntables and Movable Railroad Bridges. XVIII, Part I, 482 (1918); XIX, Part I, 463 (1919); XX, Part I, 533 (1920).

Selected Structural Douglas Fir Bridge and Trestle Timbers. XVI, Part I, 479 (1916); XVII, Part I, 704 (1917); XVIII, Part I, 617 (1918); XIX, Part I, 656 (1919).

"Test of a 40-Foot Reinforced Concrete Highway Bridge." D. A. Abrams. XIII, 884 (1913).

BRINELL HARDNESS.

See **Hardness** (page 53).

BRONZE.

See also **Alloys** (page 22).

"A Note on the Constitution of Certain Tin-Bearing Brasses." William Campbell. XX, Part II, 104 (1920).

"Aluminum Bronze: Some Recent Tests and Their Significance." W. M. Corse and G. F. Comstock. XVI, Part II, 117 (1916). Discussion, 145.

Determination of Manganese in Manganese Bronze. XVIII, Part I, 256 (1918).

Discussion on non-ferrous metals and alloys. XV, Part I, 139 (1915).

Discussion on sand-cast alloys for steam service. XVI, Part I, 193 (1916).

"Fatigue of Copper Alloys." Ernst Jonson. XV, Part II, 101 (1915). Discussion, 109.

"Inspection of Brass and Bronze." A. D. Flinn and Ernst Jonson. XVII, Part II, 212 (1917). Discussion, 224.

BRONZE (*Continued*).

Nomenclature of non-ferrous alloys. XX, Part I, 239 (1920).

Properties of 10-per-cent Aluminum Bronze. XVII, Part I, 190 (1917).

Properties of Manganese Bronze. XVII, Part I, 186 (1917).

Properties of the Alloy: Copper, 80 per cent; Tin, 10 per cent; Lead, 10 per cent. XVII, Part I, 188 (1917).

Properties of the Alloy: Copper, 88 per cent; Tin, 10 per cent; Zinc, 2 per cent. XVII, Part I, 182 (1917).

"Some Experiments on the Plastic Elongation of Wire." A. V. de Forest. XVI, Part II, 455 (1916). Discussion, 465.

Tentative Methods for Chemical Analysis of Manganese Bronze. XVIII, Part I, 510 (1918).

Tentative Specifications for:

Bronze Bearing Metal in Ingot Form. XIX, Part I, 494 (1919); XX, Part I, 565 (1920).

Bronze Bearing Metals for Turntables and Movable Railroad Bridges. XVIII, Part I, 482 (1918); XIX, Part I, 463 (1919); XX, Part I, 533 (1920).

"The Behavior of Wrought Manganese Bronze Exposed to Corrosion While Under Tensile Stress." P. D. Merica and R. W. Woodward. XIX, Part II, 278 (1919). Discussion, 289.

The Difficulty of Issuing Figures on Sand-Cast Alloys. XVI, Part I, 191 (1916).

BUILDING BRICK.

See **Brick** (page 31).

BUILDING TILE.

Absorption Tests of Tile. XVII, Part I, 353 (1917).

Compression Tests of Tile. XVII, Part I, 338 (1917).

Reports of the Committee on Hollow Building Tile:

Progress report transmitting appendices on: Compression Tests of Tile; Absorption Tests of Tile; Tests of Tile Walls. XVII, Part I, 335 (1917).

Progress report transmitting appendix on Results of Tests of Hollow Building Tile. XVIII, Part I, 293 (1918).

Tests of Hollow Building Tile. XVIII, Part I, 294 (1918).

Tests of Tile Walls. XVII, Part I, 359 (1917).

C

CALCIUM.

"Cements Producing Quick-Hardening Concrete." P. H. Bates. XIX, Part II, 425 (1919). Discussion, 439.

CARBON RESIDUE.

T. T. Gray's method of carbon residue test. XIV, Part I, 364 (1914).

Tentative Tests for Lubricants. XVII, Part I, 767 (1917).

CAR WHEELS.

See **Wheels** (page 107).

CARS.

See also **Steel, Reports of Committee** (page 89).

Tentative Revisions of Standard Specifications for Structural Steel for Cars. XX, Part I, 811 (1920).

Tentative Specifications for Wrought-Iron Rolled or Forged Blooms and Forgings for Locomotives and Cars. XVII, Part I, 573 (1917).

CAST IRON.

See also **Castings** (page 34).

"An Apparatus for Testing the Standard Cast-Iron Arbitration Bar." H. L. Morse. XVI, Part II, 282 (1916).

Discussion on cast-iron soil pipe. XVII, Part I, 135 (1917).

Discussion on methods for analysis and sampling of cast iron. XV, Part I, 126 (1915).

Discussion on the Report of Committee A-3 on Cast Iron and Finished Castings. XIV, Part I, 164 (1914).

"Effect of Machining and of Cross-Section on the Tensile Properties of Malleable Cast Iron." H. A. Schwartz. XX, Part II, 70 (1920).

"Notes on Chilled Cast Iron." E. B. Tilt. XIV, Part II, 110 (1914). Discussion, 121.

Progress Report of the American Members of International Committee 1(*b*) on Specifications for Cast Iron. XIV, Part I, 149 (1914).

Proposals for International Export Specifications for Cast-Iron Pipe and Fittings. XIV, Part I, 157 (1914).

Reports of the Committee on Cast Iron:

Recommending for adoption specifications for locomotive cylinders. Submitting Progress Report of the American members of International Committee 1(*b*) on Specifications for Cast Iron. XIV, Part I, 147 (1914). Discussion, 164.

Recommending for adoption specifications for malleable iron castings. Submitting revisions of Tentative Methods of Sampling and Analysis of Pig and Cast Iron. XV, Part I, 123 (1915). Discussion, 126.

Recommending for adoption as standard methods for sampling and analysis of pig and cast iron. XVI, Part I, 150 (1916).

Submitting revisions of the Standard Specifications for Gray-Iron Castings. Submitting as tentative specifications for: cast-iron soil pipe and fittings; railroad malleable-iron castings. XVII, Part I, 133 (1917). Discussion, 135.

Submitting revisions of the Standard Specifications for Gray-Iron Castings. Recommending for adoption as standard specifications for cast-iron soil pipe and fittings. XVIII, Part I, 156 (1918).

"Some Physical Constants of American Malleable Cast Iron." H. A. Schwartz. XIX, Part II, 247 (1919). Discussion, 266.

Tentative Specifications for Cast-Iron Soil Pipe and Fittings. XVII, Part I, 576 (1917).

Topical Discussion on Magnetic Analysis: "The Magnetic-Mechanical Analysis of Cast Iron." S. R. Williams. XIX, Part II, 130 (1919). Discussion, 136.

CASTINGS.

See also **Cast Iron** (page 34); **Steel** (page 87).

"Cast Steel Anchor Chain." H. J. Cox. XVIII, Part II, 98 (1918). Discussion, 114.

Discussion on sand-cast alloys for steam service. XVI, Part I, 193 (1916).

"Fatigue and Impact Fatigue Tests of Aluminum Alloys." W. A. Gibson. XX, Part II, 115 (1920). Discussion, 133.

"Heat Treatment of Hypo-Eutectoid Carbon-Steel Castings." J. H. Hall. XIII, 514 (1913). Discussion, 525.

"Inspection of Brass and Bronze." A. D. Flinn and Ernst Jonson. XVII, Part II, 212 (1917). Discussion, 224.

Properties of 10 per-cent Aluminum Bronze. XVII, Part I, 190 (1917).

Properties of Manganese Bronze. XVII, Part I, 186 (1917).

Properties of the Alloy: Aluminum, 92 per cent; Copper, 8 per cent. XVII, Part I, 191 (1917).

CASTINGS (*Continued*).

Properties of the Alloy: Copper, 80 per cent; Tin, 10 per cent; Lead, 10 per cent. XVII, Part I, 188 (1917).

Properties of the Alloy: Copper, 88 per cent; Tin, 10 per cent; Zinc, 2 per cent. XVII, Part I, 182 (1917).

Reports of the Committee on Malleable Castings:

Special report submitting as tentative specifications for malleable castings. Summary of the Proceedings, XVIII, Part I, 29 (1918).

Recommending for adoption as standard specifications for malleable-iron castings. XIX, Part I, 248 (1919).

"Some Tests of Light Aluminum Casting Alloys: The Effect of Heat Treatment." P. D. Merica and C. P. Karr. XIX, Part II, 297 (1919).

"Strength of Cast Zinc or Spelter." Gilbert Rigg and G. M. Williams. XIII, 669 (1913). Discussion, 698.

"Study of the Strength of Non-Ferrous Castings: Comparison of Different Test Specimens." L. P. Webbert. XIV, Part II, 145 (1914). Discussion, 159.

Tentative Specifications for:

Brass Ingot Metal for Sand Castings. XIX, Part I, 490 (1919); XX, Part I, 561 (1920).

Electric Cast Steel Anchor Chain. XVIII, Part I, 460 (1918); XIX, Part I, 444 (1919); XX, Part I, 508 (1920).

Light Aluminum Casting Alloys. XVIII, Part I, 497 (1918); XIX, Part I, 478 (1919); XX, Part I, 549 (1920).

Malleable Castings. XVIII, Part I, 464 (1918).

Non-Ferrous Alloys for Railway Equipment in Ingots, Castings, and Finished Car and Tender Bearings. XVII, Part I, 610 (1917); XVIII, Part I, 467 (1918); XIX, Part I, 458 (1919); XX, Part I, 528 (1920).

Railroad Malleable-Iron Castings. XVII, Part I, 582 (1917).

"The Charpy Impact Test on Heat-Treated Steels." J. J. Thomas. XV, Part II, 62 (1915).

The classification of American copper. XIII, 206 (1913).

The Difficulty of Issuing Figures on Sand-Cast Alloys. XVI, Part I, 191 (1916).

CEMENT.

"A New Type of Automatic Cement Tester." T. Y. Olsen. XX, Part II, 408 (1920).

"Action of Various Substances on Cement Mortars." R. K. Meade. XIII, 813 (1913). Discussion, 821.

"Additional Results Obtained with the Autoclave Test for Portland Cement." H. J. Force. XIV, Part II, 246 (1914). Discussion, 252.

"Cements Producing Quick-Hardening Concrete." P. H. Bates. XIX, Part II, 425 (1919). Discussion, 439.

Discussion on cement specifications. XVI, Part I, 206 (1916).

Discussion on free lime in cement. XVI, Part I, 203 (1916).

Discussion on high-silica portland cement. XVII, Part II, 254 (1917).

"Effect of Age on the Strength of Concrete." D. A. Abrams. XVIII, Part II, 317 (1918).

"Effect of Fineness of Cement." D. A. Abrams. XIX, Part II, 328 (1919). Discussion, 409.

"Errors in the Methods of Determining the Time of Setting of Cement." G. M. Williams. XIV, Part II, 172 (1914). Discussion, 194.

"Estimation of Fine Particles in Cement by Rate of Hydration." H. S. Spackman. XIII, 714 (1913). Discussion, 737.

"High-Silica Portland Cement." A. W. K. Billings. XVII, Part II, 239 (1917). Discussion, 254.

CEMENT (*Continued*).

"Paint Protection for Portland-Cement Surfaces." H. A. Gardner. XIV, Part II, 482 (1914). Discussion, 491.

"Properties of Cement-Lime-Sand Mortars." W. E. Emley. XVII, Part II, 261 (1917). Discussion, 273.

Report on accelerated tests of cement. XV, Part I, 147 (1915).

Reports of the Committee on Cement:

Progress report on organization of the Joint Conference on Uniform Methods of Tests and Standard Specifications for Cement. XIII, 221 (1913).

Progress report on the Joint Conference on Uniform Methods of Tests and Standard Specifications for Cement. Presenting Regulations Governing Committee C-1. XIV, Part I, 183 (1914).

Progress report submitting report of sub-committee on Accelerated Tests of Cement. XV, Part I, 144 (1915). Discussion, 149.

Recommending revisions of the Standard Specifications and Tests for Portland Cement. Submitting as tentative specifications and methods of tests for compressive strength of portland cement mortar. XVI, Part I, 200 (1916). Discussion, 203.

Progress report. XVII, Part I, 196 (1917). Discussion, 198.

Progress report. XVIII, Part I, 270 (1918).

Progress report. XIX, Part I, 262 (1919).

Submitting revisions of the Standard Specifications and Tests for Portland Cement. XX, Part I, 251 (1920).

"Results Obtained with the Autoclave Tests for Cement." H. J. Force. XIII, 740 (1913). Discussion, 751.

Sand and slag cements. XX, Part II, 199 (1920).

"Silica Cement." R. J. Montgomery. XVIII, Part II, 350 (1918).

"Strength of Lime Mortar." W. E. Emley and S. E. Young. XIV, Part II, 338 (1914).

Tentative Revisions of Standard Specifications and Tests for Portland Cement. XVI, Part I, 590 (1916); XX, Part I, 816 (1920).

Tentative Specifications and Tests for Compressive Strength of Portland-Cement Mortars. XVII, Part I, 630 (1917); XVIII, Part I, 538 (1918); XIX, Part I, 533 (1919); XX, Part I, 599 (1920).

Tentative Specifications for:

Materials for Cement Grout Filler for Brick and Stone Block Pavement. XIX, Part I, 650 (1919).

Materials for Cement Mortar Bed for Brick, Stone Block and Wood Block Pavement. XIX, Part I, 652 (1919).

"The Effect of Finer Grinding and a Higher SO_3 Content upon the Physical Properties of Portland Cement. P. H. Bates. XV, Part II, 126 (1915). Discussion, 150.

"The Microstructure of Concretes." N. C. Johnson. XV, Part II, 171 (1915). Discussion, 214.

"Thermal Activities of Portland Cement During the Period of Setting." L. N. Beals, Jr. XIII, 720 (1913). Discussion, 737.

"Volume Changes in Portland Cement and Concrete." A. H. White. XIV, Part II, 203 (1914). Discussion, 242.

CEMENT SEWER PIPE.

See **Sewer Pipe** (page 82).

CERAMICS.

See **Clay Products** (page 37).

CHAIN.

"Cast Steel Anchor Chain." H. J. Cox. XVIII, Part II, 98 (1918). Discussion, 114.

"Chain Cable and Some of Its Physical Properties." C. G. Lutts. XX, Part II, 80 (1920). Discussion, 102.

Report on tentative specifications for iron and steel chain. XV, Part I, 121 (1915); XVIII, Part I, 144 (1918).

Tentative Specifications for Electric Cast Steel Anchor Chain. XVIII, Part I, 460 (1918); XIX, Part I, 444 (1919); XX, Part I, 508 (1920).

Tests on Wrought-Iron Chain. XVIII, Part II, 105 (1918).

CHEMICAL ANALYSES.

(Methods of chemical analyses are indexed under the subjects covered by them.)

CHINESE WOOD OIL.

See **Tung Oil** (page 104).

CHROME STEEL.

"Effect of Size of Section on Physical Properties Developed by Heat Treatment." J. H. Nead. XIII, 489 (1913). Discussion, 525.

Molybdenum as an Alloying Element in Structural Steels." G. W. Sargent. XX, Part II, 5 (1920). Discussion, 29.

"Some Fatigue Tests of Nickel Steel and Chrome-Nickel Steel." H. F. Moore and A. G. Gehrig. XIX, Part II, 206 (1919). Discussion, 219.

"The Relation between Maximum Strength, Brinell Hardness and Scleroscope Hardness in Treated and Untreated Alloy and Plain Steels." R. R. Abbott. XV, Part II, 42 (1915). Discussion, 60.

"The Single Blow Notched Bar Impact Test as Used in the American Industry." E. H. Dix, Jr. XIX, Part II, 720 (1919). Discussion, 756.

Topical Discussion on Magnetic Analysis: "A Systematic Investigation of the Correlation of the Magnetic and Mechanical Properties of Steel." N. J. Gebert. XIX, Part II, 117 (1919). Discussion, 136.

Topical Discussion on the Rôle of the Several Alloying Elements in the Alloy Steels: "The Rôle of Chrome Vanadium." F. J. Griffiths. XVII, Part II, 33 (1917). Discussion, 55.

CLAY.

See also **Clay Products** (page 37).

Tentative Specifications for Natural or Artificial Sand-Clay Mixtures for Highway Surfacing. XX, Part I, 702 (1920).

Tentative Tests for:

Quantity of Clay and Silt in Sand for Highway Construction. XX, Part I, 774 (1920).

Quantity of Clay in Sand-Clay, Topsoil and Semi-Gravel for Highway Construction. XX, Part I, 772 (1920).

CLAY PRODUCTS.

See also **Building Tile** (page 33); **Drain Tile** (page 48); **Refractories** (page 73); **Sewer Pipe** (page 82).

"A Machine for Testing Clay Products." Mont Schuyler. XIV, Part II, 557 (1914).

"A Study of the Proposed A.S.T.M. Tentative Specifications for Building Brick and a Correlation of their Requirements with Sodium-Sulfate Treatment and Actual Freezing." Edward Orton, Jr. XIX, Part I, 268 (1919).

"Comparison of Heat-Insulating Properties of Materials Used in Fire-Resistive Construction." W. A. Hull. XVII, Part II, 422 (1917). Discussion, 443.

Compression Tests of Tile. XVII, Part I, 338 (1917).

"Failure of a 30-in. Tile Drain at Albert Lea, Minnesota." R. W. Crum. XVII, Part II, 453 (1917). Discussion, 464.

"Preventable Defects in Refractory Bricks." C. E. Nesbitt and M. L. Bell. XIX, Part II, 619 (1919). Discussion, 630.

CLAY PRODUCTS (*Continued*).

Results of tests on building brick reported by university laboratories. XV, Part I, 152, 160 (1915).

Results of tests to determine relation between compressive strength of bricks crushed on flat and on edge. XV, Part I, 162 (1915).

Tentative Specifications for Clay Sewer Pipe. XVII, Part I, 634 (1917); XVIII, Part I, 542 (1918); XIX, Part I, 543 (1919).

"Testing of Porosity of Electrical Porcelain." W. D. A. Peaslee. XX, Part II, 495 (1920).

Tests of Hollow Building Tile. XVIII, Part I, 294 (1918).

"The Legal Interpretation of the Word 'Vitrified' as Applied to Ceramic Products." Edward Orton, Jr. XV, Part II, 245 (1915). Discussion, 265.

"The Necessity for Inspection and Testing of Refractory Brick." C. E. Nesbitt and M. L. Bell. XVIII, Part II, 336 (1918). Discussion, 346.

"Vital Factors in the Testing of Fire-Clay Refractories and in the Interpretation of Results." R. M. Howe. XX, Part I, 278 (1920).

CLAY SEWER PIPE.

See **Sewer Pipe** (page 82).

COAL.

Calorimetric determination. XIV, Part I, 444 (1914).

Final Report of the Joint Committee on Coal Analysis of the American Society for Testing Materials and the American Chemical Society. XV, Part I, 454 (1915).

Fixed carbon and ash in coal. XIV, Part I, 426 (1914).

Moisture in coal. XIV, Part I, 419 (1914).

Phosphorus in coal ash. XIV, Part I, 434 (1914).

Preliminary Report of the Joint Committee on Coal Analysis of the American Society for Testing Materials and the American Chemical Society. XIV, Part I, 410 (1914).

Preparation of laboratory coal samples. XIV, Part I, 412 (1914).

Reports of the Committee on Coal:

Progress report. XIII, 458 (1913).

Submitting report of the Joint Committee on Coal Analysis of the American Society for Testing Materials and the American Chemical Society. Submitting reports of sub-committees on: Preparation of Laboratory Samples; Moisture; Volatile Matter; Fixed Carbon and Ash; Sulfur; Phosphorus in Ash; Ultimate Analysis; Calorimetric Determination. XIV, Part I, 409 (1914). Discussion, 453.

Submitting as tentative method for sampling of coal. XV, Part I, 357 (1915).

Recommending for adoption as standard method for sampling of coal. XVI, Part I, 319 (1916).

Progress report. XVIII, Part I, 334 (1918).

Reports of the Committee on Sampling and Analysis of Coal:

Transmitting report of the Joint Committee on Coal Analysis of the American Society for Testing Materials and the American Chemical Society. XV, Part I, 453 (1915).

Recommending for adoption as standard methods for laboratory sampling and analysis of coal. XVI, Part I, 299 (1916).

Submitting as tentative methods for determination of fusibility of coal ash. XIX, Part I, 391 (1919).

Submitting revisions of the Standard Methods for Laboratory Sampling and Analysis of Coal. XX, Part I, 427 (1920).

Sulfur in coal. XIV, Part I, 428 (1914).

Tentative Methods for Determination of Fusibility of Coal Ash. XIX, Part I, 756 (1919); XX, Part I, 796 (1920).

COAL (*Continued*).

Tentative Revisions of Standard Methods for Laboratory Sampling and Analysis of Coal. XX, Part I, 822 (1920).

"The Fusibility of Coal Ash." A. C. Fieldner, A. E. Hall and A. L. Feild. XV, Part II, 297 (1915). Discussion, 344.

Ultimate analysis of coal. XIV, Part I, 436 (1914).

Volatile matter in coal. XIV, Part I, 424 (1914).

COAL TAR.

See **Bituminous Materials** (page 29).

COATINGS.

See **Paints** (page 67); **Preservative Coatings** (page 70); **Protective Coatings** (page 72).

COKE.

Reports of the Committee on Coke:

Submitting as tentative specifications for foundry coke. XV, Part I, 359 (1915).

Recommending for adoption as standard specifications for foundry coke. Submitting as tentative methods for laboratory sampling and analysis of coke. XVI, Part I, 325 (1916).

Recommending for adoption as standard methods for laboratory sampling and analysis of coke. XVIII, Part I, 335 (1918).

Submitting revisions of the Standard Methods for Laboratory Sampling and Analysis of Coke. XX, Part I, 445 (1920).

Tentative Methods for Laboratory Sampling and Analysis of Coke. XVI, Part I, 551 (1916); XVII, Part I, 813 (1917).

Tentative Revisions of Standard Methods for Laboratory Sampling and Analysis of Coke. XX, Part I, 822 (1920).

COLD-DRAWN STEEL.

See **Steel, Cold-Drawn** (page 88).

COLD-WORKING.

See also **Steel, Cold-Drawn** (page 88).

"A Note on Stresses Caused by Cold Rolling." H. M. Howe and E. C. Groesbeck. XX, Part II, 31 (1920). Discussion, 38.

"Are the Effects of Simple Overstrain Monotropic?" H. M. Howe. XIV, Part II, 7 (1914). Discussion, 36.

"Considerations Affecting Specifications for Wrought Non-Ferrous Materials." W. Reuben Webster. XIV, Part II, 127 (1914). Discussion, 141.

"Hardness of Hard-Drawn Copper." E. H. Peirce. XVII, Part II, 114 (1917). Discussion, 122.

"Light *Versus* Heavy Reductions in Cold Working Brass." W. Reuben Webster. XVII, Part II, 156 (1917). Discussion, 162.

"On the Shattered Zones in Certain Steel Rails, with Notes on the Interior Origin of Transverse Fissures." J. E. Howard. XX, Part II, 44 (1920). Discussion, 60.

Standard Specifications for Cold-Rolled Steel Axles. XIII, 156 (1913).

Tentative Specifications for Sheet High Brass. XX, Part I, 580 (1920).

COLOR.

"A New Colorimeter for White Pigments and Some Results Obtained by Its Use." A. H. Pfund. XX, Part II, 440 (1920). Discussion, 449.

"Optical Properties and Theory of Color of Pigments and Paints." H. E. Merwin. XVII, Part II, 494 (1917). Discussion, 527.

"Supplementary Report on Color of Turpentines." I. G. Priest. XIV, Part I, 333 (1914).

COLORIMETRIC TESTS.

Abrams-Harder Field Test for Organic Impurities in Sand. XIX, Part I, 321 (1919).

"Effect of Tannic Acid on the Strength of Concrete." D. A. Abrams. XX, Part I, 309 (1920).

Suggested Colorimetric Tests for Organic Impurities in Sand. XVII, Part I, 327 (1917).

COLUMNS.

"An Investigation of the Strength and Elastic Properties of Concrete-Filled Pipe Columns." F. W. Swain and A. F. Holmes. XV, Part II, 230 (1915).

COMMITTEE REPORTS.

(Each committee report is indexed under the name of the subject with which the committee is concerned.)

COMPRESSION TESTING.

"A Simple Compression Machine for Testing Structural Materials." W. O. Lichtner. XIV, Part II, 535 (1914).

"An Investigation of the Strength and Elastic Properties of Concrete-Filled Pipe Columns." F. W. Swain and A. F. Holmes. XV, Part II, 230 (1915).

Compression Tests of Tile. XVII, Part I, 338 (1917).

Discussion on compressive strength of concrete. XVII, Part II, 375 (1917).

"Effect of Fineness of Cement." D. A. Abrams. XIX, Part II, 328 (1919). Discussion, 409.

"Effect of Hydrated Lime and Other Powdered Admixtures in Concrete." D. A. Abrams. XX, Part II, 149 (1920). Discussion, 204.

"Effect of Rate of Application of Load on the Compressive Strength of Concrete." D. A. Abrams. XVII, Part II, 364 (1917). Discussion, 375.

"Effect of Tannic Acid on the Strength of Concrete." D. A. Abrams. XX, Part I, 309 (1920).

Outline of Compression Tests of Concrete for Investigation of Properties of Concrete Mixtures. XX, Part I, 294 (1920).

"Relation Between Methods of Curing Standard Concrete Test Specimens and Their Compressive Strength at 28 Days." H. W. Green. XIX, Part II, 607 (1919).

Results of tests on building brick reported by university laboratories. XV, Part I, 152, 160 (1915).

Results of tests to determine relation between compressive strength of bricks crushed on flat and on edge. XV, Part I, 162 (1915).

"Some Determinations of the Stress-Deformation Relations for Concretes under Repeated and Continuous Loadings." G. M. Williams. XX, Part II, 233 (1920). Discussion, 250.

"Spherical Bearings." Mont Schuyler. XIII, 1004 (1913).

"Strength of Cast Zinc or Spelter." Gilbert Rigg and G. M. Williams. XIII, 669 (1913). Discussion, 698.

"Strength of Lime Mortar." W. E. Emley and S. E. Young. XIV, Part II, 338 (1914).

Tentative Specifications and Tests for Compressive Strength of Portland-Cement Mortars. XVII, Part I, 630 (1917); XVIII, Part I, 538 (1918); XIX, Part I, 533 (1919); XX, Part I, 599 (1920).

"Tests of Concrete Road Aggregates." J. P. Nash. XVII, Part II, 394 (1917). Discussion, 417.

Tests of Hollow Building Tile. XVIII, Part I, 294 (1918).

Tests of Tile Walls. XVII, Part I, 359 (1917).

"The Necessity for Inspection and Testing of Refractory Brick." C. E. Nesbitt and M. L. Bell. XVIII, Part II, 336 (1918). Discussion, 346.

CONCRETE.

See also **Aggregates** (page 20).

Abrams-Harder Field Test for Organic Impurities in Sand. XIX, Part I, 321 (1919).

Addition of foreign substances to cement or during mixture for waterproofing. XIII, 461 (1913).

"A Laboratory Method of Determining Pressures on Walls and Bins." J. Hammond Smith. XV, Part II, 382 (1915). Discussion, 395.

"A Method of Making Wear Tests of Concrete." D. A. Abrams. XVI, Part II, 194 (1916).

"A New Form of Specifications for Concrete Aggregates." C. M. Chapman. XVI, Part II, 180 (1916). Discussion, 188.

"An Investigation of the Strength and Elastic Properties of Concrete-Filled Pipe Columns." F. W. Swain and A. F. Holmes. XV, Part II, 230 (1915).

"Blast-Furnace Slag as Aggregate in Concrete." W. A. Aiken. XIV, Part II, 280 (1914). Discussion, 288.

By-Laws of the Joint Committee on Standard Specifications for Concrete and Reinforced Concrete. XX, Part I, 258 (1920).

Causes of permeability of concrete. XIII, 460 (1913).

"Cements Producing Quick-Hardening Concrete." P. H. Bates. XIX, Part II, 425 (1919). Discussion, 439.

"Comparison of Heat-Insulating Properties of Materials Used in Fire Resistive Construction." W. A. Hull. XVII, Part II, 422 (1917). Discussion, 443.

Discussion on compressive strength of concrete. XVII, Part II, 375 (1917).

Discussion on concrete failures. XIV, Part II, 329 (1914).

Discussion on consistency of concrete, by Watson Davis. XX, Part I, 442 (1920).

Discussion on excess water in concrete. XVII, Part II, 385 (1917).

Discussion on proportioning concrete aggregates. XIV, Part II, 267 (1914).

Discussion on proportioning of concrete. XVII, Part II, 295 (1917).

"Economical Proportions for Portland-Cement Mortars and Concretes." J. A. Kitts. XVII, Part II, 279 (1917). Discussion, 295.

"Effect of Age on the Strength of Concrete." D. A. Abrams. XVIII, Part II, 317 (1918).

"Effect of Fineness of Cement." D. A. Abrams. XIX, Part II, 328 (1919). Discussion, 409.

"Effect of Hydrated Lime and Other Powdered Admixtures in Concrete." D. A. Abrams. XX, Part II, 149 (1920). Discussion, 204.

"Effect of Rate of Application of Load on the Compressive Strength of Concrete." D. A. Abrams. XVII, Part II, 364 (1917). Discussion, 375.

"Effect of Rodding Concrete." F. E. Giesecke. XX, Part II, 219 (1920). Discussion, 231.

"Effect of Tannic Acid on the Strength of Concrete." D. A. Abrams. XX, Part I, 309 (1920).

"Effects of Grading of Sands and Consistency of Mix upon the Strength of Plain and Reinforced Concrete." L. N. Edwards. XVII, Part II, 301 (1917). Discussion, 358. XVIII, Part II, 303 (1918).

"Examination of Concrete Failures for Their Determining Causes." R. S. Greenman. XIV, Part II, 321 (1914). Discussion, 329.

External treatments for waterproofing concrete. XIII, 462 (1913).

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

"Impact Test on Concrete to Regulate Coarse and Fine Aggregate Qualities and Mixes for Highways." H. S. Mattimore. XX, Part II, 266 (1920). Discussion, 277.

CONCRETE (*Continued*).

"Modulus of Elasticity of Concrete." Stanton Walker. XIX, Part II, 510 (1919). Discussion, 586.

Outline of Compression Tests of Concrete for Investigation of Properties of Concrete Mixtures. XX, Part I, 294 (1920).

"Paint Protection for Portland-Cement Surfaces." H. A. Gardner. XIV, Part II, 482 (1914). Discussion, 491.

"Proportioning Aggregates for Portland-Cement Concrete." Albert Moyer. XIV, Part II, 255 (1914). Discussion, 267.

"Proportioning of Pit-Run Gravel for Concrete." R. W. Crum. XIX, Part II, 458 (1919). Discussion, 476.

"Proportioning the Materials of Mortars and Concretes by Surface Areas of Aggregates." L. N. Edwards. XVIII, Part II, 235 (1918). Discussion, 284.

"Proportions and Quantities of Materials for Concrete for Highway Construction." D. A. Abrams. XX, Part I, 437 (1920).

Reinforced concrete failing in sea water. Discussion by R. J. Wig. XVII, Part I, 280 (1917).

"Relation between Methods of Curing Standard Concrete Test Specimens and Their Compressive Strength at 28 Days." H. W. Green. XIX, Part II, 607 (1919).

Report of Joint Committee on Concrete and Reinforced Concrete. XIII, 224 (1913).

"Report on a Permeability Test for Paints and Varnishes." A. M. Muckenfuss. XIV, Part II, 359 (1914). Discussion, 426.

Report on weight, voids, density, specific gravity and consistency of concrete and concrete aggregates. XX, Part I, 340 (1920).

Reports of the Committee on Concrete and Concrete Aggregates:

Progress report outlining organization of the committee. XV, Part I, 173 (1915).

Progress report. XVI, Part I, 264 (1916).

Progress report transmitting appendices on: "Suggested Methods for Making and Testing Field Specimens of Concrete"; "Suggested Colorimetric Tests for Organic Impurities in Sand"; report of Joint Conference Committee on Provisional Definitions, Tests and Methods Pertaining to Non-Bituminous Road Materials. XVII, Part I, 319 (1917).

Progress report transmitting appendix on Abrams-Harder Field Test for Organic Impurities in Sand. XIX, Part I, 318 (1919).

Submitting as tentative methods for making and storing specimens of concrete in the field; method for determination of voids in fine aggregate for cement concrete; test for unit weight of aggregate for cement concrete Transmitting an Outline of Compression Tests of Concrete for Investigation of Properties of Concrete Mixtures. Transmitting report of sub-committee on Weight, Voids, Density, Specific Gravity and Consistency. Transmitting a paper on "Effect of Tannic Acid on the Strength of Concrete," by D. A. Abrams. XX, Part I, 291 (1920).

"Some Determinations of the Stress-Deformation Relations for Concretes Under Repeated and Continuous Loadings." G. M. Williams. XX, Part II, 233 (1920). Discussion, 250.

"Some Theoretical Studies on Proportioning Concrete by the Method of Surface Area of Aggregates." R. B. Young. XIX, Part II, 444 (1919). Discussion, 476.

Suggested Colorimetric Tests for Organic Impurities in Sand. XVII, Part I, 327 (1917).

Suggested Methods for Making and Testing Field Specimens of Concrete. XVII, Part I, 322 (1917).

CONCRETE (*Continued*).

Tentative Methods for Determination of Voids in Fine Aggregate for Cement Concrete. XX, Part I, 652 (1920).

Tentative Methods for Making and Storing Specimens of Concrete in the Field. XX, Part I, 653 (1920).

Tentative Specifications for:

Cement-Concrete Sewer Pipe. XVII, Part I, 647 (1917); XVIII, Part I, 555 (1918); XIX, Part I, 556 (1919).

Workability of Concrete for Concrete Pavements. XX, Part I, 692 (1920).

Tentative Test for Unit Weight of Aggregate for Cement Concrete. XX, Part I, 624 (1920).

"Testing Concrete Aggregates." C. M. Chapman. XIV, Part II, 298 (1914). Discussion, 304.

"Test of a 40-Foot Reinforced Concrete Highway Bridge." D. A. Abrams. XIII, 884 (1913).

"Tests of Concrete Road Aggregates." J. P. Nash. XVII, Part II, 394 (1917). Discussion, 417.

"Tests of Concrete Slabs to Determine the Effect of Removing Excess Water Used in Mixing." A. N. Johnson. XVII, Part II, 379 (1917). Discussion, 385.

"Tests of Mortars Made from Wisconsin Aggregates." M. O. Withey. XIII, 834 (1913).

"Tests of Natural Concrete Aggregates." R. S. Greenman. XIII, 828 (1913).

"Tests of Reinforced Concrete Slabs under Concentrated Loading." A. T. Goldbeck. XIII, 858 (1913). Discussion, 874.

"The Microstructure of Concretes." N. C. Johnson. XV, Part II, 171 (1915). Discussion, 214.

"The Volume-Moisture Relation in Sand and a Method of Determining Surface Area Based Thereon." R. B. Young and W. D. Walcott. XX, Part II, 137 (1920).

Topical Discussion on Cooperation in Industrial Research: "Cooperation of the Portland Cement Association and Lewis Institute in Experimental Studies of Concrete." D. A. Abrams. XVIII, Part II, 56 (1918).

"Volume Changes in Portland Cement and Concrete." A. H. White. XIV, Part II, 203 (1914). Discussion, 242.

Waterproofing concrete. Discussion by A. H. Rhett. XVII, Part I, 264 (1917).

"Weight-Volumetric Proportioning of Concrete Aggregates in Testing." J. A. Kitts. XV, Part II, 153 (1915). Discussion, 161.

Yield point of concrete. XIX, Part II, 581 (1919).

CONCRETE, REINFORCED.

By-Laws of the Joint Committee on Standard Specifications for Concrete and Reinforced Concrete. XX, Part I, 258 (1920).

"Condensed Report of the Investigation of Reinforcing Bars Rerolled from Steel Rails." W. K. Hatt. XIII, 96 (1913).

"Effects of Grading of Sands and Consistency of Mix upon the Strength of Plain and Reinforced Concrete." L. N. Edwards. XVII, Part II, 301 (1917). Discussion, 358; XVIII, Part II, 303 (1918).

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

Reinforced concrete failing in sea water. Discussion by R. J. Wig. XVII, Part I, 280 (1917).

"Relation between Deformation and Deflection in Reinforced-Concrete Beams." G. A. Maney. XIV, Part II, 310 (1914).

Report of Joint Committee on Concrete and Reinforced Concrete. XIII, 224 (1913).

CONCRETE, REINFORCED (*Continued*).

Reports of the Committee on Reinforced Concrete:

Submitting Joint Committee Report on Concrete and Reinforced Concrete. XIII, 223 (1913).

Transmitting final report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 201 (1917). Discussion, 263.

Progress report. XVIII, Part I, 273 (1918).

Progress report. XIX, Part I, 264 (1919).

Outlining the organization of a Joint Committee on Standard Specifications for Concrete and Reinforced Concrete. Transmitting By-Laws of the Joint Committee on Standard Specifications for Concrete and Reinforced Concrete. XX, Part I, 253 (1920).

Standard Specifications for Rail-Steel Concrete Reinforcement Bars. XIII, 153 (1913).

"Test of a 40-Foot Reinforced Concrete Highway Bridge." D. A. Abrams. XIII, 884 (1913).

"Tests of Reinforced Concrete Slabs Under Concentrated Loading." A. T. Goldbeck. XIII, 858 (1913). Discussion, 874.

"The Strength of Clamped Splices in Concrete Reinforcement Bars." E. L. Lasier. XVI, Part II, 209 (1916). Discussion, 233.

CONCRETE SEWER PIPE.

See **Sewer Pipe** (page 82).

CONCRETE, WATERPROOFING OF.

See **Waterproofing** (page 106).

CONDENSER TUBES.

See **Tubes** (page 104).

CONSISTENCY.

See also **Penetration** (page 68); **Softening Point** (page 84).

"A New Consistency Tester for Viscous Liquid Bituminous Materials." Prévost Hubbard and F. P. Pritchard. XVII, Part II, 603 (1917). Discussion, 621.

Discussion on consistency of concrete, by Watson Davis. XX, Part I, 442 (1920).

"Effect of Fineness of Cement." D. A. Abrams. XIX, Part II, 328 (1919). Discussion, 409.

"Effects of Grading of Sands and Consistency of Mix upon the Strength of Plain and Reinforced Concrete." L. N. Edwards. XVII, Part II, 301 (1917). Discussion, 358. XVIII, Part II, 303 (1918);

"Further Development of the Plastometer and Its Practical Application to Research and Routine Problems." Henry Green. XX, Part II, 451 (1920). Discussion, 483.

"Method and Apparatus for Determining Consistency." C. M. Chapman. XIII, 1045 (1913). Discussion, 1052.

"Method for Studying the Effects of Temperature upon the Physical Condition of Asphalts, Waxes, etc." J. A. Capp and F. A. Hull. XVII, Part II, 627 (1917). Discussion, 635.

"Paint, A Plastic Material and not a Viscous Liquid; the Measurement of Its Mobility and Yield Value." E. C. Bingham and Henry Green. XIX, Part II, 640 (1919). Discussion, 665.

Report on penetration of bituminous materials. XVI, Part I, 306 (1916).

Report on softening point determination of bituminous materials (Ring-and-Ball and Cube methods). XV, Part I, 341 (1915).

Report on weight, voids, density, specific gravity and consistency of concrete and concrete aggregates. XX, Part I, 340 (1920).

CONSISTENCY (*Continued*).

"Some Determinations of the Stress-Deformation Relations for Concretes under Repeated and Continuous Loadings." G. M. Williams. XX, Part II, 233 (1920). Discussion, 250.

Tentative Specifications for Workability of Concrete for Concrete Pavements. XX, Part I, 692 (1920).

COPPER.

See also **Alloys** (page 22); **Copper Wire** (page 46).

"A Note on the Constitution of Certain Tin-Bearing Brasses." William Campbell. XX, Part II, 104 (1920).

Classification of American copper. XIII, 206 (1913).

"Considerations Affecting Specifications for Wrought Non-Ferrous Materials." W. Reuben Webster. XIV, Part II, 127 (1914). Discussion, 141.

Determination of Manganese in Manganese Bronze. XVIII, Part I, 256 (1918).

Discussion on sand-cast alloys for steam service. XVI, Part I, 193 (1916).

"Electrolytic Determination of Tin on Tinned Copper Wire." G. G. Grower. XVII, Part II, 129 (1917). Discussion, 153.

"Fatigue of Copper Alloys." Ernst Jonson. XV, Part II, 101 (1915). Discussion, 109.

"Hardness of Hard-Drawn Copper." E. H. Peirce. XVII, Part II, 114 (1917). Discussion, 122.

"Lead-Tin-Antimony and Tin-Antimony-Copper Alloys." William Campbell. XIII, 630 (1913). Discussion, 666.

Properties of 10-per-cent Aluminum Bronze. XVII, Part I, 190 (1917).

Properties of Manganese Bronze. XVII, Part I, 186 (1917).

Properties of the Alloy: Aluminum, 92 per cent; Copper, 8 per cent. XVII, Part I, 191 (1917).

Properties of the Alloy: Copper, 80 per cent; Tin, 10 per cent; Lead, 10 per cent. XVII, Part I, 188 (1917).

Properties of the Alloy: Copper, 88 per cent; Tin, 10 per cent; Zinc, 2 per cent. XVII, Part I, 182 (1917).

"Some Tests of Light Aluminum Casting Alloys: The Effect of Heat Treatment." P. D. Merica and C. P. Karr. XIX, Part II, 297 (1919).

Standard Specifications for:

Electrolytic Copper Wire Bars, Cakes, Slabs, Billets, Ingots, and Ingot Bars. XIII, 218 (1913).

Lake Copper Wire Bars, Cakes, Slabs, Billets, Ingots, and Ingot Bars. XIII, 214 (1913).

Tentative Methods for:

Battery Assay of Copper. XIX, Part I, 517 (1919).

Chemical Analysis of Alloys of Lead, Tin, Antimony and Copper. XVII, Part I, 622 (1917); XVIII, Part I, 502 (1918); XIX, Part I, 509 (1919); XX, Part I, 589 (1920).

Tentative Revisions of Standard Specifications for Copper Bars for Locomotive Staybolts. XX, Part I, 816 (1920).

Tentative Specifications for:

Copper Bars for Locomotive Staybolts. XVI, Part I, 441 (1916); XVII, Part I, 592 (1917).

Copper Plates for Locomotive Fireboxes. XVI, Part I, 437 (1916); XVII, Part I, 588 (1917).

Seamless Copper Boiler Tubes. XVI, Part I, 444 (1916); XVII, Part I, 595 (1917).

The Alloy: Copper, 88 per cent; Tin, 10 per cent; Zinc, 2 per cent. XVI, Part I, 434 (1916); XVII, Part I, 585 (1917).

"The Influence of Very Low Percentages of Copper in Retarding the Corrosion of Steel." D. M. Buck. XIX, Part II, 224 (1919). Discussion, 238.

COPPER WIRE.

"Considerations Affecting Specifications for Wrought Non-Ferrous Materials." W. Reuben Webster. XIV, Part II, 127 (1914). Discussion, 141.

"Electrolytic Determination of Tin on Tinned Copper Wire." G. G. Grower. XVII, Part II, 129 (1917). Discussion, 153.

Hardness of Hard-Drawn Copper. E. H. Peirce. XVII, Part II, 114 (1917). Discussion, 122.

Proposed Tentative Specifications for Insulated Wire and Cable: 30-per-cent Hevea Rubber. XV, Part I, 411 (1915).

Reports of the Committee on Copper Wire:

Recommending revisions in Standard Specifications for: Hard-Drawn Copper Wire; Medium Hard-Drawn Copper Wire; Soft or Annealed Copper Wire; XIII, 198 (1913). Discussion, 205.

Progress report. XIV, Part I, 176 (1914).

Submitting revisions in Standard Specifications for: Hard-Drawn Copper Wire; Medium Hard-Drawn Copper Wire; Soft or Annealed Copper Wire. Submitting as tentative specifications for: bare concentric-lay copper cable: hard, medium-hard or soft; high-strength bronze trolley wire, round and grooved: 40 and 65-per-cent conductivity. XV, Part I, 133 (1915).

Recommending for adoption as standard specifications for: bare concentric-lay cable: hard, medium-hard, or soft; high-strength bronze trolley wire, round and grooved: 40 and 65-per-cent conductivity. XVI, Part I, 177 (1916).

Submitting as tentative specifications for tinned, soft or annealed copper wire for rubber insulation. XIX, Part I, 250 (1919).

"Some Experiments on the Plastic Elongation of Wire." A. V. de Forest. XVI, Part II, 455 (1916). Discussion, 465.

Standard Specifications for:

Electrolytic Copper Wire Bars, Cakes, Slabs, Billets, Ingots, and Ingot Bars. XIII, 218 (1913).

Lake Copper Wire Bars, Cakes, Slabs, Billets, Ingots, and Ingot Bars. XIII, 214 (1913).

Tentative Specifications for:

Insulated Wire and Cable: 30-per-cent Hevea Rubber. XVI, Part I, 492 (1916); XVII, Part I, 737 (1917); XVIII, Part I, 650 (1918); XIX, Part I, 689 (1919); XX, Part I, 736 (1920).

Tinned Soft or Annealed Copper Wire for Rubber Insulation. XIX, Part I, 503 (1919); XX, Part I, 574 (1920).

"Wire-Testing Extensometer." T. D. Lynch and P. H. Brace. XIX, Part II, 695 (1919). Discussion, 707.

CORROSION.

Corrosion of metal reinforcement. XIII, 244 (1913); XVII, Part I, 212 (1917).

Corrosion of metal reinforcement. Discussion by R. J. Wig. XVII, Part I, 266 (1917).

Discussion on atmospheric corrosion tests of iron and steel sheets. XIX, Part I, 241 (1919).

"Interior Surface Defects on Brass Condenser Tubes as a Cause of Corrosion." W. Reuben Webster. XVII, Part II, 204 (1917).

"Method for Testing the Durability of Pipe under Corrosion." F. N. Speller. XVI, Part II, 343 (1916). Discussion, 346.

"Method of Making the Salt-Spray Corrosion Test." A. N. Finn. XVIII, Part I, 237 (1918).

Resistance to corrosion of aluminum alloys in the salt-spray test. XIX, Part II, 320 (1919).

CORROSION (*Continued*).

Reports of the Committee on Corrosion of Iron and Steel:

Progress report outlining series of corrosion tests. XV, Part I, 130 (1915).

Progress report submitting analyses of steel sheets to be used in corrosion tests. XVI, Part I, 153 (1916).

Transmitting report on preservative metallic coatings for metals. XVII, Part I, 143 (1917). Discussion, 175.

Transmitting report on analysis of steel sheets used in corrosion tests; report of sub-committee on inspection of sheets in corrosion tests. Transmitting papers on "Structure of Commercial Zinc Coatings," by H. S. Rawdon; "Method of Making the Salt-Spray Corrosion Test," by A. N. Finn. XVIII, Part I, 158 (1918). Discussion, 240.

Transmitting reports of sub-committees on: Preservative Metallic Coatings; Inspection of Sheets in Corrosion Tests. Transmitting Results of Re-Analyses of Doubtful Elements in Corrosion Test Sheets. XIX, Part I, 177 (1919). Discussion, 241.

Transmitting reports of sub-committees on: Preservative Metallic Coatings for Metals; Inspection of Sheets in Corrosion Tests; Total Immersion Tests. XX, Part I, 145 (1920).

"Tests on the Rate of Corrosion of Metals." A. W. Carpenter. XIII, 617 (1913). Discussion, 625.

"The Behavior of Wrought Manganese Bronze Exposed to Corrosion while under Tensile Stress." P. D. Merica and R. W. Woodward. XIX, Part II, 278 (1919). Discussion, 289.

"The Influence of Very Low Percentages of Copper in Retarding the Corrosion of Steel." D. M. Buck. XIX, Part II, 224 (1919). Discussion, 238.

CORROSION CRACKING.

"Fatigue of Copper Alloys." Ernst Jonson. XV, Part II, 101 (1915). Discussion, 109.

Topical Discussion on Season and Corrosion Cracking of Brass:

"Initial Stress and Corrosion Cracking." P. D. Merica and R. W. Woodward. XVIII, Part II, 165 (1918). Discussion, 201.

"Season Cracking." W. Reuben Webster. XVIII, Part II, 163 (1918). Discussion, 201.

"Season Cracking and Splitting of Condenser Tubes and Pipes." William Campbell. XVIII, Part II, 147 (1918). Discussion, 201.

"The Causes and Prevention of Corrosion Cracking." W. H. Bassett. XVIII, Part II, 153 (1918). Discussion, 201.

"The Prevention of Season and Corrosion Cracking of Brass Artillery Cases by Special Heat Treatment." W. B. Price. XVIII, Part II, 179 (1918). Discussion, 201.

"The Use of Mercury Solutions for Predicting Season Cracking in Brass." H. S. Rawdon. XVIII, Part II, 189 (1918). Discussion, 201.

CREOSOTE OIL.

See also **Oils** (page 65).

Discussion on wooden paving blocks. XVIII, Part I, 340 (1918).

Methods for determination of specific gravity of fractions of creosote oil. XVI, Part I, 337 (1916).

Report on water sampling in creosote oil. XVI, Part I, 328 (1916).

Tentative Methods for:

Analysis of Creosote Oil. XVII, Part I, 826 (1917).

Sampling and Analysis of Creosote Oil. XVI, Part I, 564 (1916).

Tentative Specifications for Creosote Oil for Priming Coat with Coal-Tar Pitch for Use in Damp-Proofing and Waterproofing. XVII, Part I, 721 (1917); XVIII, Part I, 639 (1918); XIX, Part I, 678 (1919); XX, Part I, 725 (1920).

D

DEFINITIONS.

See **Nomenclature** (page 64).

DENSITY.

See **Specific Gravity** (page 85).

DISTILLATION.

See also **Bituminous Materials** (page 29); **Preservative Coatings, Reports of Committee** (page 70).

Barometric correction. XIX, Part I, 365 (1919).

Examination of samples of turpentine preliminary to the preparation of specifications for turpentine. XIV, Part I, 316 (1914).

Report on distillation of bituminous materials suitable for road treatment. XVI, Part I, 302 (1916); XVIII, Part I, 331 (1918).

Report on distillation of paint thinners other than turpentine. XV, Part I, 260 (1915); XVI, Part I, 290 (1916).

Tentative Revisions of Standard Methods for Distillation of Bituminous Materials Suitable for Road Treatment. XVII, Part I, 474 (1917).

Tentative Tests for Paint Thinners other than Turpentine. XVI, Part I, 518 (1916).

DOUGLAS FIR.

See also **Timber** (page 101).

Tentative Specifications for:

Selected Structural Douglas Fir Bridge and Trestle Timbers. XVI, Part I, 479 (1916); XVII, Part I, 704 (1917); XVIII, Part I, 617 (1918); XIX, Part I, 656 (1919).

Structural Douglas Fir. XX, Part I, 704 (1920).

"The Need of a Quality Classification for Douglas Fir." J. A. Newlin. XVI, Part I, 340 (1916).

DRAIN TILE.

See also **Sewer Pipe** (page 82).

"Failure of a 30-in. Tile Drain at Albert Lea, Minnesota." R. W. Crum. XVII, Part II, 453 (1917). Discussion, 464.

Reports of the Committee on Drain Tile:

Progress Report on Specifications for Drain Tile. XIII, 303 (1913).

Recommending for adoption specifications for drain tile. XIV, Part I, 208 (1914).

Progress report. XV, Part I, 165 (1915).

Submitting revisions of the Standard Specifications for Drain Tile. XVI, Part I, 259 (1916). Discussion, 262.

Progress report. XVII, Part I, 311 (1917).

Progress report. XIX, Part I, 308 (1919).

Submitting revisions of the Standard Specifications for Drain Tile. XX, Part I, 268 (1920).

Specifications for minimum bearing strength of drain tile. XIII, 307 (1913).

Tentative Revisions of Standard Specifications for Drain Tile. XX, Part I, 817 (1920).

DRIERS, PAINTS.

See **Paints** (page 67).

DRILLS.

"An Efficiency Testing Machine for Testing Drills, Taps and Dies." T. Y. Olsen. XIV, Part II, 541 (1914).

Magnetic testing of drills. XIX, Part II, 42 (1919).

DRILLS (*Continued*).

Topical Discussion on Magnetic Analysis: "Magnetic Analysis as a Criterion of the Quality of Steel and Steel Products." C. W. Burrows and F. P. Fahy. XIX, Part II, 5 (1919). Discussion, 136.

DUCTILITY.

See also **Bituminous Materials** (page 29).

"Ductility Testing Machines." T. Y. Olsen. XX, Part II, 398 (1920). Discussion, 404.

Report on ductility tests of bitumen. XV, Part I, 349 (1915).

"Some Experiments on the Plastic Elongation of Wire." A. V. de Forest. XVI, Part II, 455 (1916). Discussion, 465.

"Testing of Sheet Brass." C. H. Davis. XVII, Part II, 164 (1917). Discussion, 199.

E

ELASTICITY MODULUS OF.

"Modulus of Elasticity of Concrete." Stanton Walker. XIX, Part II, 510 (1919). Discussion, 586.

"Some Determinations of the Stress-Deformation Relations for Concrete under Repeated and Continuous Loadings." G. M. Williams. XX, Part II, 233 (1920). Discussion, 250.

ELASTIC LIMIT.

See also **Yield Point** (page 109).

"An Apparatus for Delicate Flexure Tests and Some Results of Such Tests." W. J. Francke. XX, Part II, 372 (1920). Discussion, 387.

Discussion on elastic limit. XV, Part II, 431 (1915).

"Elastic Limit." T. D. Lynch. XV, Part II, 415 (1915). Discussion, 431.

General discussion on yield point and proportional limit. XVI, Part II, 434 (1916).

"Improved Elastic Limit Recorder." C. H. Marshall. XX, Part II, 361 (1920).

"Rapid Semi-Autographic Tests for Determining the Proportional Limit." H. F. Moore. XVII, Part II, 589 (1917). Discussion, 596.

"Sumner Elastic-Limit Recorder." J. L. Jones and C. H. Marshall. XVIII, Part II, 478 (1918).

"The Relation Between Yield Point and Proportional Limit in Various Grades of Steel." J. E. Howard. XVI, Part II, 403 (1916). Discussion, 434.

"The Relation Between Yield Point and Proportional Limit in Various Grades of Steel." T. D. Lynch. XVI, Part II, 413 (1916). Discussion, 434.

"The Relation Between Yield Point and Proportional Limit in Various Grades of Steel." H. F. Moore and F. B. Seely. XVI, Part II, 426 (1916). Discussion, 434.

EMULSIFICATION.

"Determination of Resistance of Lubricating Oils to Emulsification." V. R. Abrams, C. H. Osmond and T. G. Delbridge. XX, Part I, 416 (1920).

Discussion on emulsification of lubricants. XX, Part I, 424 (1920).

"Emulsification of Mineral Lubricating Oils: Apparatus and Test Method." P. H. Conradson. XVI, Part II, 273 (1916). Discussion, 280.

"Quantitative Test for Resistance of Lubricating Oils to Emulsification." W. H. Herschel. XVI, Part II, 248 (1915). Discussion, 266

ENAMELS.

See also **Paints** (page 67).

"Report on a Permeability Test for Paints and Varnishes." A. M. Muckenfuss. XIV, Part II, 359 (1914). Discussion, 426.

ENDURANCE TESTS.

See **Fatigue** (page 50); **Repeated Stress** (page 75).

ENGINE-BOLT IRON.

See **Wrought Iron** (page 108).

ETCHING.

See **Metallography** (page 62).

EVAPORATION.

See also **Oils** (page 65).

Report on evaporation of paint thinners other than turpentine. XV, Part I, 259 (1915); XVI, Part I, 290 (1916).

Report on evaporation tests of lubricating oil. XVIII, Part I, 323 (1918).

Report on test for loss on heating of oil and asphaltic compounds. XVI, Part I, 302 (1916).

Tentative Test for Loss on Heating of Oil and Asphaltic Compounds. XIX, Part I, 732 (1919).

EXECUTIVE COMMITTEE.

Reports of Executive Committee: Annual Reports on Membership, Publications, Finances, Committees, Regulations and By-Laws, Relations with Other Societies, and General Executive Directions of Society Activities: XIII, 38 (1913); XIV, Part I, 39 (1914); XV, Part I, 42 (1915); XVI, Part I, 45 (1916); XVII, Part I, 56 (1917); XVIII, Part I, 59 (1918); XIX, Part I, 95 (1919); XX, Part I, 43 (1920).

EXPLOSIVES.

"Suggestions as to Standard Specifications to Promote Efficiency and Safety in Explosives Used in Blasting." C. P. Beistle. XIII, 1108 (1913).

EXTENSOMETER.

See **Strainometer** (page 93).

F

FABRICS.

See **Textile Materials** (page 99).

FATIGUE.

See also **Repeated Stress** (page 75).

"Aluminum Bronze: Some Recent Tests and Their Significance." W. M. Corse and G. F. Comstock. XVI, Part II, 117 (1916). Discussion, 145.

"Endurance and Impact Tests of Metals." D. J. McAdam, Jr. XVI, Part II, 292 (1916). Discussion, 307.

"Fatigue and Impact Fatigue Tests of Aluminum Alloys." W. A. Gibson. XX, Part II, 115 (1920). Discussion, 133.

"Fatigue of Copper Alloys." Ernst Jonson. XV, Part II, 101 (1915). Discussion, 109.

"Fatigue Testing Machine." F. M. Farmer. XIX, Part II, 709 (1919). Discussion, 717.

"Recrystallization as a Factor in the Failure of Boiler Tubes." A. E. White and H. F. Wood. XVI, Part II, 80 (1916). Discussion, 111.

"Some Fatigue Tests of Nickel Steel and Chrome-Nickel Steel." H. F. Moore and A. G. Gehrig. XIX, Part II, 206 (1919). Discussion, 219.

"The Failure of Materials under Repeated Stress." H. F. Moore and F. B. Seely. XV, Part II, 437 (1915). Discussion, 463.

FIBER.

See also **Textile Materials** (page 99).

"Identification of Manila Fibers." C. E. Swett. XVII, Part I, 377 (1918).

FIREBOXES.

Tentative Specifications for:

Boiler and Firebox Steel for Stationary Service. XVI, Part I, 429 (1916); XVII, Part I, 557 (1917); XVIII, Part I, 449 (1918); XIX, Part I, 433 (1919); XX, Part I, 497 (1920).

Copper Plates for Locomotive Fireboxes. XVI, Part I, 437 (1916); XVII, Part I, 588 (1917).

FIRE HOSE.

See **Hose** (page 55).

FIREPROOFING.

"Comparison of Heat-Insulating Properties of Materials Used in Fire-Resistive Construction." W. A. Hull. XVII, Part II, 422 (1917). Discussion, 443.

Discussion on fireproofing. XVII, Part I, 300 (1917).

Reports of the Committee on Fireproofing Materials:

Progress Report. XIV, Part I, 206 (1914).

Submitting revisions of the Standard Tests for Fireproof Partition Construction; Fireproof Floor Construction. Submitting as tentative method for control of fire tests and classification of materials and construction as determined by tests. XVII, Part I, 295 (1917). Discussion, 300.

Recommending for adoption as standard specifications for fire tests of materials and construction. XVIII, Part I, 281 (1918). Addendum, 283.

Tentative Methods for Control of Fire Tests and Classification of Materials and Construction as Determined by Test. XVII, Part I, 679 (1917).

FLASH POINT.

Flash point of paint thinners other than turpentine. XIV, Part I, 313 (1914); XV, Part I, 260 (1915); XVI, Part I, 291 (1916); XVII, Part I, 402 (1917).

Flash point tests of turpentine with tag closed tester. XIX, Part I, 372 (1919).

Report of U. S. Bureau of Standards on Tag Closed Testers. XIX, Part I, 367 (1919).

Standardization of tag closed tester by the U. S. Bureau of Standards. XIX, Part I, 364 (1919).

Tentative Tests for Flash Point for Paint Thinners Other than Turpentine. XVIII, Part I, 685 (1918).

FLEXURE.

See **Transverse Testing** (page 103).

FLOORS.

See **Fireproofing** (page 51).

FORESTRY.

See **Timber** (page 101).

FORGINGS.

See also **Steel, Reports of Committee** (page 89).

"A New Vibratory Testing Machine and Results Obtained by Its Use." S. V. Hunnings. XIV, Part II, 548 (1914).

Calculation of Energy Expended in Bending a Beam. XVII, Part I, 115 (1917).

"Deep Etching of Rails and Forgings." F. M. Waring and K. E. Hofammann. XIX, Part II, 182 (1919). Discussion, 189.

Discussion on deep etching of rails and forgings. XIX, Part II, 189 (1919).

Discussion on steel forging blooms. XIII, 179 (1913).

Discussion on steel wheels. XIII, 176 (1913).

"Heat Treatment of Carbon-Steel Locomotive Axles: Water *vs.* Oil Quenching." C. D. Young. XVI, Part II, 53 (1916). Discussion, 65.

FORGINGS (*Continued*).

Report of the Investigation of Wrought Steel Wheels. XIII, 126 (1913).

Report on Proof Tests of Finished Forgings. XIV, Part I, 120 (1914).

Report on specifications for plates for forge welding. XIX, Part I, 150 (1919).

Standard Specifications for Blooms, Billets and Slabs for Carbon-Steel Forgings. XIII, 166 (1913).

Tentative Specifications for:

Brass Forging Rod. XVII, Part I, 603 (1917).

Wrought-Iron Rolled or Forged Blooms and Forgings for Locomotives and Cars. XVII, Part I, 573 (1917).

"The Charpy Impact Test on Heat-Treated Steels." J. J. Thomas. XV, Part II, 62 (1915).

"The Single Blow Notched Bar Impact Test as Used in the American Industry." E. H. Dix, Jr. XIX, Part II, 720 (1919). Discussion, 756.

Topical Discussion on the Rôle of the Several Alloying Elements in the Alloy Steels: "The Rôle of Vanadium." G. L. Norris. XVII, Part II, 20 (1917). Discussion, 47.

Values of Percentages of Elongation and Reduction of Area Based on Inverse Ratio of the Tensile Strength. XIV, Part I, 118 (1914).

FUEL.

See **Coal** (page 38); **Coke** (page 39).

FUSIBILITY.

Tentative Methods for Determination of Fusibility of Coal Ash. XIX, Part I, 756 (1919); XX, Part I, 796 (1920).

"The Fusibility of Coal-Ash." A. C. Fieldner, A. E. Hall and A. L. Feild. XV, Part II, 297 (1915). Discussion, 344.

G

GALVANIZING.

See **Zinc** (page 109).

GIRDER RAILS.

See **Rails** (page 72).

GLUE.

"Specifications and Tests of Glue." Oscar Linder and E. C. Frost. XIV, Part II, 508 (1914).

GRADING RULES.

See **Timber** (page 101).

GRAVEL.

"An Abrasion Test for Stone, Gravel and Similar Aggregates." H. H. Scofield. XVIII, Part II, 416 (1918). Discussion, 426.

"Proportioning of Pit-Run Gravel for Concrete." R. W. Crum. XIX, Part II, 458 (1919). Discussion, 476.

Tentative Methods for Sampling of Stone, Slag, Gravel, Sand and Stone Block for Use as Highway Materials, Including Some Material Survey Methods. XX, Part I, 789 (1920).

Tentative Specifications for Commercial Sizes of Sand and Gravel for Highway Construction. XX, Part I, 696 (1920).

Tentative Tests for:

Quantity of Clay and Silt in Gravel for Highway Construction. XX, Part I, 770 (1920).

Quantity of Clay in Sand-Clay, Topsoil, and Semi-Gravel for Highway Construction. XX, Part I, 772 (1920).

"The Sampling of Deposits of Road Stone and Gravel in the Field." L. Reinecke and K. A. Clark. XVIII, Part II, 393 (1918). Discussion, 414.

GUN METAL.

See also **Alloys** (page 22).

"Fatigue of Copper Alloys." Ernst Jonson. XV, Part II, 101 (1915). Discussion, 109.

Tentative Methods for Chemical Analysis of Gun Metal. XVIII, Part I, 523 (1918).

Tentative Specifications for the Alloy: Copper, 88 per cent; Tin, 10 per cent; Zinc, 2 per cent. XVI, Part I, 434 (1916); XVII, Part I, 585 (1917).

GYPSUM.

"Comparison of Heat-Insulating Properties of Materials Used in Fire-Resistive Construction." W. A. Hull. XVII, Part II, 422 (1917). Discussion, 443.

Reports of the Committee on Gypsum:

Progress report outlining organization of committee. XV, Part I, 179 (1915). Discussion, 181.

Submitting as tentative definitions of terms relating to the gypsum industry. XVI, Part I, 268 (1916).

Submitting as tentative specifications for: gypsum; calcined gypsum; methods for tests of gypsum and gypsum products. Transmitting reports on: Gypsum Plasters; Design of Reinforced Gypsum Beams. XIX, Part I, 325 (1919).

Submitting revisions of the Tentative Specifications for: Gypsum; Calcined Gypsum; Tentative Methods for Tests of Gypsum and Gypsum Products. Submitting as tentative specifications for gypsum plaster. XX, Part I, 380 (1920).

Report on Design of Reinforced Gypsum Beams. XIX, Part I, 348 (1919).

Report on Gypsum Plasters. XIX, Part I, 331 (1919).

Tentative Definitions of Terms Relating to the Gypsum Industry. XVI, Part I, 452 (1916); XVII, Part I, 681 (1917); XVIII, Part I, 592 (1918); XIX, Part I, 628 (1919); XX, Part I, 658 (1920).

Tentative Methods for Tests of Gypsum and Gypsum Products. XIX, Part I, 613 (1919); XX, Part I, 634 (1920).

Tentative Specifications for:

Calcined Gypsum. XIX, Part I, 578 (1919); XX, Part I, 612 (1920).

Gypsum. XIX, Part I, 575 (1919); XX, Part I, 609 (1920).

Gypsum Plasters. XX, Part I, 616 (1920).

H

HARDNESS.

See also **Impact Testing** (page 56); **Toughness** (page 103); **Wearing Properties** (page 106).

"A Method of Making Wear Tests of Concrete." D. A. Abrams. XVI, Part II, 195 (1916). Discussion, 203.

"A New Method for Calibrating Brinell Hardness Testing Machines." J. L. Jones and C. H. Marshall. XX, Part II, 392 (1920). Discussion, 396.

"A New Method of Obtaining Brinell Hardness." J. G. Ayers, Jr. XVIII, Part II, 460 (1918). Discussion, 466.

"A Simple Type of Brinell Testing Machine for 500-kg. Load." A. V. de Forest. XVIII, Part II, 449 (1918). Discussion, 466.

"Development of Brinell Hardness Tests on Thin Brass Sheet." S. L. Goodale and R. M. Banks. XIX, Part II, 757 (1919).

Discussion on hardness testing. XVIII, Part II, 466 (1918).

Discussion on methods of testing. XIV, Part I, 397 (1914).

"Effect of Size of Section on Physical Properties Developed by Heat Treatment." J. H. Nead. XIII, 489 (1913). Discussion, 525.

HARDNESS (*Continued*).

"Endurance and Impact Tests of Metals." D. J. McAdam, Jr. XVI, Part II, 292 (1916). Discussion, 307.

"Hardness of Hard-Drawn Copper." E. H. Peirce. XVII, Part II, 114 (1917). Discussion, 122.

"Hardness Tests: Relation Between Brinell Ball-Test and Scleroscope Readings." J. J. Thomas. XIV, Part II, 72 (1914). Discussion, 75.

"Mechanical Tests of Heat-Treated Spring Steel." R. P. Devries. XIII, 550 (1913). Discussion, 561.

Methods for Brinell hardness tests of metals. XIV, Part I, 391 (1914).

"Notes on the Hardening and Tempering of Eutectoid Carbon Steel and on the Shore Test." H. M. Howe and A. G. Levy. XVI, Part II, 5 (1916). Discussion, 51.

Report of the Committee on Hardness Tests:

Progress report. XIII, 196 (1913).

"Resistance of Steels to Wear in Relation to Their Hardness and Tensile Properties." G. L. Norris. XIII, 562 (1913). Discussion, 568.

"Some Tests of Light Aluminum Casting Alloys: The Effect of Heat Treatment." P. D. Merica and C. P. Karr. XIX, Part II, 297 (1919).

"Testing of Sheet Brass." C. H. Davis. XVII, Part II, 164 (1917). Discussion, 199.

"The Relation Between Maximum Strength, Brinell Hardness and Scleroscope Hardness in Treated and Untreated Alloy and Plain Steels." R. R. Abbott. XV, Part II, 42 (1915). Discussion, 60.

HAVRE DE GRACE BRIDGE TESTS.

See **Paints** (page 67).

HEAT TREATMENT.

"Aluminum Bronze: Some Recent Tests and Their Significance." W. M. Corse and G. F. Comstock. XVI, Part II, 117 (1916). Discussion, 145.

"An Investigation Leading to Specifications for Brass Condenser Tubes." A. E. White. XVI, Part II, 151 (1916). Discussion, 168.

"Annealing Temperatures and Grain Growth." D. J. McAdam, Jr. XVII, Part II, 58 (1917). Discussion, 75.

"Changes Within the Critical Range of a Given Steel: From Ac_1 to Ac_{3-2}." J. G. Ayers, Jr. XVIII, Part II, 87 (1918).

"Effect of Size of Section on Physical Properties Developed by Heat Treatment." J. H. Nead. XIII, 489 (1913). Discussion, 525.

General discussion on heat treatment of steel. XIII, 525 (1913).

"Grain Size of Iron as Affected by Temperature." D. J. McAdam, Jr. XVIII, Part II, 68 (1918). Discussion, 82.

"Heat Treatment of Carbon-Steel Locomotive Axles: Water *vs.* Oil Quenching." C. D. Young. XVI, Part II, 53 (1916). Discussion, 65.

"Heat Treatment of Hypo-Eutectoid Carbon-Steel Castings." J. H. Hall. XIII, 514 (1913). Discussion, 525.

"Influence of Mass in the Heat Treatment of Steel." K. W. Zimmerschied. XIII, 510 (1913). Discussion, 525.

"Internal Stresses Developed by Different Quenching Mediums and Their Effects." H. V. Wille. XV, Part II, 27 (1915). Discussion, 39.

"Magnetic Habits of Alloy-Steels." J. A. Mathews. XIV, Part II, 50 (1914) Discussion, 67.

"Mechanical Tests of Heat-Treated Spring Steel." R. P. Devries. XIII, 550 (1913). Discussion, 561.

"Micrographic Determination of Surface Decarburization in Heat-Treated Steels." J. G. Ayers, Jr. XV, Part II, 80 (1915).

HEAT TREATMENT (*Continued*).

"Notes on the Hardening and Tempering of Eutectoid Carbon Steel and on the Shore Test." H. M. Howe and A. G. Levy. XVI, Part II, 5 (1916). Discussion, 51.

Proposed Recommended Practice for the Heat Treatment of Case-Hardened Carbon Steel Objects. XIII, 188 (1913).

"Recrystallization as a Factor in the Failure of Boiler Tubes." A. E. White and H. F. Wood. XVI, Part II, 80 (1916). Discussion, 111.

Reports of the Committee on Heat Treatment of Iron and Steel:

Submitting Proposed Recommended Practice for the Heat Treatment of Case-Hardened Carbon Steel Objects. XIII, 188 (1913).

Recommending for adoption recommended practice for the annealing of carbon steel castings; recommended practice for the heat treatment of case-hardened carbon steel objects. XIV, Part I, 169 (1914).

Progress report. XVI, Part I, 152 (1916).

"Some Neglected Phenomena in the Heat Treatment of Steel." M. E. Leeds. XV, Part II, 5 (1915). Discussion, 23.

"Some Physical Constants of American Malleable Cast Iron." H. A. Schwartz. XIX, Part II, 247 (1919). Discussion, 266.

"Some Tests of Light Aluminum Casting Alloys: The Effect of Heat Treatment." P. D. Merica and C. P. Karr. XIX, Part II, 297 (1919).

"Testing of Sheet Brass." C. H. Davis. XVII, Part II, 164 (1917). Discussion, 199.

"The Charpy Impact Test on Heat-Treated Steels." J. J. Thomas. XV, Part II, 62 (1915).

"The Relation between Maximum Strength, Brinell Hardness and Scleroscope Hardness in Treated and Untreated Alloy and Plain Steels." R. R. Abbott. XV, Part II, 42 (1915). Discussion, 60.

Topical Discussion on Season and Corrosion Cracking of Brass: "The Prevention of Season and Corrosion Cracking of Brass Artillery Cases by Special Heat Treatment." W. B. Price. XVIII, Part II, 179 (1918). Discussion, 201.

HEXABROMIDE NUMBER.

"A New Hexabromide Test for Linseed Oil." L. L. Steel and F. M. Washburn. XX, Part I, 396 (1920).

Description of New Method for Determination of Hexabromide Number of Linseed Oil Fatty Acids. XIII, 393 (1913).

Work on hexabromide values of linseed oil. XX, Part I, 395 (1920).

HIGHWAYS.

See **Bituminous Materials** (page 29); **Brick** (page 31); **Concrete** (page 41); **Road Materials** (page 76).

HOLLOW BUILDING TILE.

See **Building Tile** (page 33).

HOSE.

"An Autographic Friction Testing Machine for Testing Mechanical Rubber Goods." J. M. Bierer. XIV, Part II, 627 (1914). Discussion, 634.

"Construction of Steam Hose." J. M. Bierer. XX, Part II, 355 (1920). Discussion, 359.

"Steam Hose." H. J. Force. XIX, Part II, 687 (1919).

Tentative Revisions of Standard Specifications for:

$2\frac{5}{8}$-in. Cotton Rubber-Lined Fire Hose for Private Department Use. XIX, Part I, 778 (1919); XX, Part I, 819 (1920).

$2\frac{1}{2}$, 3 and $3\frac{1}{2}$-in. Double-Jacketed Cotton Rubber-Lined Fire Hose for Public Fire Department Use. XIX, Part I, 779 (1919); XX, Part I, 819 (1920).

HOSE (*Continued*).

Tentative Specifications for:

$2\frac{1}{2}$, 3 and $3\frac{1}{2}$-in. Double-Jacketed Cotton Rubber-Lined Fire Hose for Public Fire Department Use. XVI, Part I, 487 (1916); XVII, Part I, 732 (1917).

Air-Line Hose for Pneumatic Tools. XVII, Part I, 763 (1917).

Leader Hose for Use with Pneumatic Tools. XIX, Part I, 724 (1919).

Steam Hose. XVIII, Part I, 681 (1918); XIX, Part I, 720 (1919).

Tentative Tests for Cotton Fabrics for Use in Hose, Belting, and Similar Articles. XVI, Part I, 533 (1916); XVII, Part I, 793 (1917).

HYDRATED LIME.

See **Lime** (page 58).

I

IMPACT TESTING.

"Effect of Controllable Variables on the Toughness Test for Rock." F. H. Jackson, Jr. XVII, Part II, 571 (1917). Discussion, 586.

"Endurance and Impact Tests of Metals." D. J. McAdam, Jr. XVI, Part II, 292 (1916). Discussion, 307.

"Fatigue and Impact Fatigue Tests of Aluminum Alloys." W. A. Gibson. XX, Part II, 115 (1920). Discussion, 133.

"Impact Test on Concrete to Regulate Coarse and Fine Aggregate Qualities and Mixes for Highways." H. S. Mattimore. XX, Part II, 266 (1920). Discussion, 277.

"Notes on the Property of Toughness of Metals." A. F. Shore. XIII, 612 (1913).

"Practical Methods for Testing Refractory Fire Brick." C. E. Nesbitt and M. L. Bell. XVI, Part II, 349 (1916). Discussion, 373.

"Suggested Improvements in the Manufacture of Silica Brick." C. E. Nesbitt and M. L. Bell. XVII, Part II, 467 (1917). Discussion, 483.

Tentative Tests for Toughness of Rock. XVII, Part I, 773 (1917).

"The Charpy Impact Test on Heat-Treated Steels." J. J. Thomas. XV, Part II, 62 (1915).

"The Single Blow Notched Bar Impact Test as Used in the American Industry." E. H. Dix, Jr. XIX, Part II, 720 (1919). Discussion, 756.

INDUSTRIAL RESEARCH.

See **Research** (page 75).

INGOTS.

"Annealing Temperatures and Grain Growth." D. J. McAdam, Jr. XVII, Part II, 58 (1917). Discussion, 75.

"Ladle Test Ingot Investigation." Report by J. R. Cain and H. S. Rawdon. XIX, Part I, 154 (1919).

"Report on Investigation of Ladle-Test Steel Ingots." J. R. Cain and H. S. Rawdon. XVI, Part I, 129 (1916).

Segregation as shown by sulfur prints. XVI, Part I, 133 (1916).

Standard Specifications for:

Electrolytic Copper Wire Bars, Cakes, Slabs, Billets, Ingots and Ingot Bars. XIII, 218 (1913).

Lake Copper Wire Bars, Cakes, Slabs, Billets, Ingots and Ingot Bars. XIII, 214 (1913).

Tentative Specifications for:

Aluminum Ingots for Remelting and for Rolling. XVIII, Part I, 492 (1918); XIX, Part I, 473 (1919); XX, Part I, 543 (1920).

Brass Ingot Metal for Sand Castings. XIX, Part I, 490 (1919); XX, Part I, 591 (1920).

INGOTS (*Continued*).

Tentative Specifications for (*Continued*):

Bronze Bearing Metal in Ingot Form. XIX, Part I, 494 (1919); XX, Part I, 565 (1920).

Non-Ferrous Alloys for Railway Equipment in Ingots, Castings, and Finished Car and Tender Bearings. XVII, Part I, 610 (1917); XVIII, Part I, 467 (1918); XIX, Part I, 458 (1919); XX, Part I, 528 (1920).

INSTRUMENTS.

See **Testing Apparatus** (page 95).

INSULATING MATERIALS.

"Comparison of Heat-Insulating Properties of Materials Used in Fire-Resistive Construction." W. A. Hull. XVII, Part II, 422 (1917). Discussion, 443.

Proposed Tentative Specifications for Insulated Wire and Cable: 30-per-cent Hevea Rubber. XV, Part I, 411 (1915).

Reports of the Committee on Insulating Materials:

Progress report. XV, Part I, 407 (1915).

Submitting as tentative tests for molded insulating materials. XVII, Part I, 489 (1917). Discussion, 491.

Progress report. XVIII, Part I, 349 (1918).

Tentative Specifications for:

Adhesive Insulating Tape. XX, Part I, 761 (1920).

Insulated Wire and Cable: 30-per-cent Hevea Rubber. XVI, Part I, 492 (1916); XVII, Part I, 737 (1917); XVIII, Part I, 650 (1918); XIX, Part I, 689 (1919); XX, Part I, 736 (1920).

Tinned Soft or Annealed Copper Wire for Rubber Insulation. XIX, Part I, 503 (1919); XX, Part I, 574 (1920).

Tentative Tests for Molded Insulating Materials. XVII, Part I, 778 (1917); XVIII, Part I, 694 (1918); XIX, Part I, 736 (1919); XX, Part I, 776 (1920).

"Testing of Porosity of Electrical Porcelain." W. D. A. Peaslee. XX, Part II, 495 (1920).

INTERNATIONAL ASSOCIATION FOR TESTING MATERIALS.

Progress Report of the American Members of International Committee 1(*b*) on Specifications for Cast Iron. XIV, Part I, 149 (1914).

"Report on Proceedings of Turin Meeting of the Council of the International Association for Testing Materials." H. M. Howe. XIV, Part I, 76 (1914). Discussion, 79.

"The Work of Committees." Address by the President, Mansfield Merriman, at the Nineteenth Annual Meeting. XVI, Part I, 34 (1916).

IRON.

See also **Cast Iron** (page 34); **Malleable Cast Iron** (page 62); **Wrought Iron** (page 108).

"Annealing Temperatures and Grain Growth." D. J. McAdam, Jr. XVII, Part II, 58 (1917). Discussion, 75.

"Oxygen in Iron and Steel: Value of Existing Methods for Its Determination." W. R. Fleming. XIII, 477 (1913). Discussion, 487.

Progress Report of the American Members of International Committee 1(*b*) on Specifications for Cast Iron. XIV, Part I, 149 (1914).

"Recrystallization as a Factor in the Failure of Boiler Tubes." A. E. White and H. F. Wood. XVI, Part II, 80 (1916). Discussion, 111.

Report on preparation of iron and steel surfaces for painting. XVI, Part I, 293 (1916); XVII, Part I, 451 (1917); XVIII, Part I, 310 (1918); XIX, Part I, 374 (1919).

"Report on Proceedings of Turin Meeting of the Council of the International Association for Testing Materials." H. M. Howe. XIV, Part I, 76 (1914).

"Results of Tests of Welded Boiler Tubes." E. L. Lasier. XIII, 606 (1913).

IRON (*Continued*).

Tentative Revisions of:

Standard Specifications for Engine-Bolt Iron. XIX, Part I, 778 (1919); XX, Part I, 813 (1920).

Standard Tests for Magnetic Properties of Iron and Steel. XVI, Part I, 580 (1916).

Tentative Specifications for Railroad Malleable-Iron Castings. XVII, Part I, 582 (1917).

L

LABORATORIES.

"The New Physical and Chemical Laboratory of the Pennsylvania Railroad Company at Altoona." C. D. Young. XV, Part II, 348 (1915).

Topical Discussion on Cooperation in Industrial Research: Laboratories Engaged in Industrial Research Partly or Wholly. XVIII, Part II, 47 (1918).

LEAD.

See also **Alloys** (page 22).

Discussion on sand-cast alloys for steam service. XVI, Part I, 193 (1916).

"Lead-Tin-Antimony and Tin-Antimony-Copper Alloys." William Campbell. XIII, 630 (1913). Discussion, 666.

"Method of Sampling and Analysis of Tin, Terne and Lead-Coated Sheets." J. A. Aupperle. XIV, Part II, 162 (1914). Discussion, 169.

Properties of the Alloy: Copper, 80 per cent; Tin, 10 per cent; Lead, 10 per cent. XVII, Part I, 188 (1917).

Tentative Methods for:

Chemical Analysis of Alloys of Lead, Tin, Antimony and Copper. XVII, Part I, 622 (1917); XVIII, Part I, 502 (1918); XIX, Part I, 509 (1919); XX, Part I, 589 (1920).

Chemical Analysis of Pig Lead. XIX, Part I, 523 (1919).

Routine Analysis of Dry Red Lead. XVII, Part I, 796 (1917).

Tentative Specifications for:

Lead. XIX, Part I, 483 (1919).

Pig Lead. XX, Part I, 554 (1920).

Solder Metal. XIX, Part I, 498 (1919); XX, Part I, 569 (1920).

LIME.

"Effect of Hydrated Lime and Other Powdered Admixtures in Concrete." D. A. Abrams. XX, Part II, 149 (1920). Discussion, 204.

"Properties of Cement-Lime-Sand Mortars." W. E. Emley. XVII, Part II, 261 (1917). Discussion, 273.

Proposed Standard Specifications for Lime. XIII, 315 (1913).

Reports of the Committee on Lime:

Submitting Proposed Standard Specifications for Lime. XIII, 313 (1913). Discussion, 320.

Submitting revised Tentative Specifications for: Quicklime; Hydrated Lime. XIV, Part I, 213 (1914). Discussion, 220.

Recommending for adoption specifications for: quicklime; hydrated lime. XV, Part I, 167 (1915). Discussion, 171.

Submitting as tentative specifications for masons' hydrated lime. XVII, Part I, 312 (1917).

Submitting as tentative methods for chemical analysis of limestone, lime and hydrated lime. Submitting revisions of the Tentative Specifications for Masons' Hydrated Lime. XIX, Part I, 310 (1919).

Progress report. XX, Part I, 271 (1920).

LIME (*Continued*).

"Strength of Lime Mortar." W. E. Emley and S. E. Young. XIV, Part II, 338 (1914).

Tentative Methods for Chemical Analysis of Limestone, Lime and Hydrated Lime. XIX, Part I, 597 (1919); XX, Part I, 626 (1920).

Tentative Revisions of Standard Specifications for Hydrated Lime. XX, Part I, 816 (1920).

Tentative Specifications for:

Hydrated Lime. XIV, Part I, 217 (1914).

Masons' Hydrated Lime. XVII, Part I, 661 (1917); XVIII, Part I, 569 (1918); XIX, Part I, 571 (1919); XX, Part I, 605 (1920).

Quicklime. XIV, Part I, 214 (1914).

LINSEED OIL.

"A New Hexabromide Test for Linseed Oil." L. L. Steele and F. M. Washburn. XX, Part I, 396 (1920).

Description of New Method for Determination of Hexabromide Number of Linseed Oil Fatty Acids. XIII, 393 (1913).

Reports on linseed oil:

A test for determination of foots and reports of analysts. XVII, Part I, 377 (1917).

Results of foots tests on raw linseed oil and reports of analysts. XVIII, Part I, 299 (1918).

Results of tests on raw and boiled linseed oil and comments of analysts. XV, Part I, 224 (1915).

Results of tests on South American and India seed and comments of analysts. XIII, 372 (1913).

Results of tests on South American seed and comments of analysts. XVI, Part I, 283 (1916).

Standard Specifications for the Purity of Raw Linseed Oil from North American Seed. XIII, 399 (1913).

"Supplementary Report on Density and Thermal Expansion of Linseed Oil." H. W. Bearce and E. L. Peffer. XIV, Part I, 262 (1914).

Tentative Specifications for Foots Permissible in Properly Clarified Pure Linseed Oil from North American Seed. XVIII, Part I, 615 (1918); XIX, I, 648 (1919); XX, Part I, 678 (1920).

"The Acceptability of Linseed Oil." C. D. Holley. XVI, Part II, 239 (1916). Discussion, 246.

Work on hexabromide values of linseed oil. XX, Part I, 395 (1920).

LOCOMOTIVES.

See also **Steel, Reports of Committee** (page 89).

"Heat Treatment of Carbon-Steel Locomotive Axles: Water *vs.* Oil Quenching." C. D. Young. XVI, Part II, 53 (1916). Discussion, 65.

Specifications for locomotive materials. XIV, Part I, 101 (1914).

Tentative Revisions of Standard Specifications for:

Copper Bars for Locomotive Staybolts. XX, Part I, 816 (1920).

Lap-Welded and Seamless Steel Boiler Tubes for Locomotives. XX, Part I, 812 (1920).

Structural Steel for Locomotives. XX, Part I, 811 (1920).

Tentative Specifications for:

Copper Bars for Locomotive Staybolts. XVI, Part I, 441 (1916); XVII, Part I, 592 (1917).

Copper Plates for Locomotive Fireboxes. XVI, Part I, 437 (1916); XVII, Part I, 588 (1917).

Wrought-Iron Rolled or Forged Blooms and Forgings for Locomotives and Cars. XVII, Part I, 573 (1917).

LUBRICANTS.

"A Cylinder Friction and Lubrication Testing Apparatus." A. E. Flowers. XV, Part II, 399 (1915). Discussion, 412.

"Determination of Absolute Viscosity by the Saybolt Universal and Engler Viscosimeters." W. H. Herschel. XVII, Part II, 551 (1917). Discussion, 569.

"Determination of Resistance of Lubricating Oils to Emulsification." V. R. Abrams, C. H. Osmond and T. G. Delbridge. XX, Part I, 416 (1920).

Discussion on emulsification of lubricants. XX, Part I, 424 (1920).

"Emulsification of Mineral Lubricating Oils: Apparatus and Test Method." P. H. Conradson. XVI, Part II, 273 (1916). Discussion, 280.

"Internal-Combustion Engine: Lubrication and Lubricants." P. H. Conradson. XVIII, Part II, 387 (1918).

Proposed Provisional Test for Lubricants. XIV, Part I, 358 (1914).

Proposed Standard Tests for Lubricants. XV, Part I, 279 (1915).

"Quantitative Test for Resistance of Lubricating Oils to Emulsification." W. H. Herschel. XVI, Part II, 248 (1916). Discussion, 266.

Reports of the Committee on Lubricants:

Submitting Proposed Provisional Tests for Lubricants. XIV, Part I, 356 (1914). Discussion, 368.

Progress report transmitting "Conversion Tables for Saybolt Universal, Engler and Redwood Viscosimeters," by C. W. Waidner. XV, Part I, 273 (1915). Discussion, 295.

Submitting as tentative tests for lubricants. XVII, Part I, 462 (1917).

Recommending for adoption as standard tests for lubricants. Transmitting report of sub-committee on Evaporation Tests. XVIII. Part I, 321 (1918).

Submitting as tentative test for viscosity of lubricants. XIX, Part I, 388 (1919). Discussion, 389.

Recommending for adoption as standard test for viscosity of lubricants. Transmitting report of sub-committees on: Sulfur Determination; Emulsification. Transmitting paper on "Determination of Resistance of Lubricating Oils to Emulsification," by V. R. Abrams, C. H. Osmond and T. G. Delbridge. XX, Part I, 406 (1920). Discussion, 424.

Report on evaporation tests of lubricating oil. XVIII, Part I, 323 (1918).

Report on sulfur determination in lubricants. XX, Part I, 407 (1920).

Tentative Tests for:

Lubricants. XVII, Part I, 767 (1917).

Viscosity of Lubricants. XIX, Part I, 728 (1919).

"The Standard Saybolt Universal Viscosimeter." W. H. Herschel. XVIII, Part II, 363 (1918).

T. T. Gray's method of carbon residue test. XIV, Part I, 364 (1914).

"Viscosity Measurement and a New Viscosimeter." A. E. Flowers. XIV, Part II, 565 (1914).

LUMBANG OIL.

Preliminary Report Made in Compliance with the Department of State's Instruction Concerning the Sources of Lumbang and Perilla Oils. XVII, Part I, 375 (1917).

Reports of Analysts on Lumbang and Perilla Oils. XVII, Part I, 366 (1917).

M

MACROGRAPHS.

See **Metallography** (page 62).

MAGNESIUM.

See also **Alloys** (page 22).

"Some Tests of Light Aluminum Casting Alloys: The Effect of Heat Treatment." P. D. Merica and C. P. Karr. XIX, Part II, 297 (1919).

"Testing of Refractories." A. V. Bleininger. XIII, 967 (1913).

MAGNETIC TESTING.

Discussion on magnetic testing. XVII, Part II, 105 (1917).

Effect of silicon upon magnetic properties. XVII, Part II, 17 (1917).

"Magnetic Criteria of the Mechanical Properties of a One-Per-Cent-Carbon Steel." C. W. Burrows. XIII, 570 (1913).

"Magnetic Habits of Alloy Steels." J. A. Mathews. XIV, Part II, 50 (1914). Discussion, 67.

Magnetic testing of alloy steels. XIX, Part II, 25 (1919).

Magnetic testing of drills. XIX, Part II, 42 (1919).

Magnetic testing of tools. XIX, Part II, 40 (1919).

Reports of the Committee on Magnetic Properties:

Recommending for adoption revisions in the Standard Magnetic Tests of Iron and Steel. XIV, Part I, 170 (1914).

Submitting revision in Standard Tests for Magnetic Properties of Iron and Steel. Transmitting Tables of Equivalents. XVI, Part I, 171 (1916).

Submitting revisions of the Standard Tests for Magnetic Properties of Iron and Steel. XVIII, Part I, 243 (1918).

Progress report. XX, Part I, 231 (1920).

"Some Applications of Magnetic Analysis to the Study of Steel Products." C. W. Burrows. XVII, Part II, 87 (1917). Discussion, 105.

"Some Physical Constants of American Malleable Cast Iron." H. A. Schwartz. XIX, Part II, 247 (1919). Discussion, 266.

Tables of Equivalents: gausses to ampere-turns per inch. XVI, Part I, 174 (1916).

Tables of Equivalents: kilogausses to kilolines per square inch. XVI, Part I, 175 (1916).

Tables of Equivalents: watts per kilogram to watts per pound. XVI, Part I, 176 (1916).

Tentative Revisions of Standard Tests for Magnetic Properties of Iron and Steel. XVI, Part I, 580 (1916).

Topical Discussion on Magnetic Analysis:

"Application of Magnetic Analysis to the Testing of Ball Bearing Races." R. L. Sanford and M. F. Fischer. XIX, Part II, 68 (1919). Discussion, 136.

"A Systematic Investigation of the Correlation of the Magnetic and Mechanical Properties of Steel." N. J. Gebert. XIX, Part II, 117 (1919). Discussion, 136.

"Certain Aspects of Magnetic Analysis." C. Nusbaum. XIX, Part II, 95 (1919). Discussion, 136.

"Location of Flaws in Rifle Barrel Steel by Magnetic Analysis." R. L. Sanford and W. B. Kouwenhoven. XIX, Part II, 80 (1919). Discussion, 136.

"Magnetic Analysis as a Criterion of the Quality of Steel and Steel Products." C. W. Burrows and F. P. Fahy. XIX, Part II, 5 (1919). Discussion, 136.

"Magnetic Surveys on New and Failed Rails." P. H. Dudley. XIX, Part II, 51 (1919). Discussion, 136.

"The Magnetic-Mechanical Analysis of Cast Iron." S. R. Williams. XIX, Part II, 130 (1919). Discussion, 136.

MALLEABLE CAST IRON.

See also **Castings** (page 34).

"Effect of Machining and of Cross-Section on the Tensile Properties of Malleable Cast Iron." H. A. Schwartz. XX, Part II, 70 (1920).

Reports of the Committee on Malleable Castings, see **Castings** (page 34).

"Some Physical Constants of American Malleable Cast Iron." H. A. Schwartz. XIX, Part II, 247 (1919). Discussion, 266.

Tentative Specifications for Railroad Malleable Iron Castings. XVII, Part I, 582 (1917).

MANGANESE BRONZE.

See also **Alloys** (page 22).

Determination of Manganese in Manganese Bronze. XVIII, Part I, 256 (1918).

Properties of Manganese Bronze. XVII, Part I, 186 (1917).

Tentative Methods for Chemical Analysis of Manganese Bronze. XVIII, Part I, 510 (1918).

"The Behavior of Wrought Manganese Bronze Exposed to Corrosion While Under Tensile Stress." P. D. Merica and R. W. Woodward. XIX, Part II, 278 (1919). Discussion, 289.

MANGANESE STEEL.

Report on Procedure for Standardizing Arsenite Solutions for Manganese Determinations by the A.S.T.M. Standard Method. XVI, Part I, 126 (1916).

Topical Discussion on the Rôle of the Several Alloying Elements in the Alloy Steels: "The Rôle of Manganese." H. M. Howe. XVII, Part II, 5 (1917). Discussion, 45.

METALLOGRAPHY.

"Annealing Temperatures and Grain Growth." D. J. McAdam, Jr. XVII, Part II, 58 (1917). Discussion, 75.

"Changes Within the Critical Range of a Given Steel: From Ac_1 to Ac_{3-2}." J. G. Ayers, Jr. XVIII, Part II, 87 (1918).

"Deep Etching of Rails and Forgings." F. M. Waring and K. E. Hofammann. XIX, Part II, 182 (1919). Discussion, 189.

Discussion on deep etching of rails and forgings. XIX, Part II, 189 (1919).

Discussion on standard magnifications. XVII, Part I, 509 (1917).

Estimation of segregation by the appearance of the transversely fractured section of the rail. XVI, Part I, 93 (1916).

"Grain Size of Iron as Affected by Temperature." D. J. McAdam, Jr. XVIII, Part II, 68 (1918). Discussion, 82.

"Micrographic Determination of Surface Decarburization in Heat-Treated Steels." J. G. Ayers, Jr. XV, Part II, 80 (1915).

"Molten Zinc as a Reagent for the Macroscopic Etching of Iron and Steel." J. L. Jones. XV, Part II, 89 (1915). Discussion, 96.

"Recrystallization as a Factor in the Failure of Boiler Tubes." A. E. White and H. F. Wood. XVI, Part II, 80 (1916). Discussion, 111.

Reports of the Committee on Magnification Scales for Micrographs:

Submitting as tentative definitions and rules governing the preparation of micrographs of metals and alloys. XVII, Part I, 508 (1917). Discussion, 509.

Submitting revisions of the Tentative Definitions and Rules Governing the Preparation of Micrographs of Metals and Alloys. XVIII, Part I, 425 (1918).

Submitting revisions of the Tentative Definitions and Rules Governing the Preparation of Micrographs of Metals and Alloys. XIX, Part I, 422 (1919).

Recommending for adoption as standard definitions and rules governing the preparation of micrographs of metals and alloys. XX, Part I, 475 (1920).

METALLOGRAPHY (*Continued*).

Tentative Definitions and Rules Governing the Preparation of Micrographs of Metals and Alloys. XVII, Part I, 838 (1917); XVIII, Part I, 716 (1918); XIX, Part I, 768 (1919).

Topical Discussion on Magnetic Analysis: "Certain Aspects of Magnetic Analysis." C. Nusbaum. XIX, Part II, 95 (1919). Discussion, 136.

METHODS OF TESTING.

See **Testing, Methods of** (page 96).

MICROGRAPHS.

See **Metallography** (page 62).

MOLYBDENUM STEEL.

"Molybdenum as an Alloying Element in Structural Steels." G. W. Sargent. XX, Part II, 5 (1920). Discussion, 29.

MORTAR.

See also **Concrete** (page 41).

"Action of Various Substances on Cement Mortars." R. K. Meade. XIII, 813 (1913). Discussion, 821.

Discussion on proportioning of concrete. XVII, Part II, 295 (1917).

"Economical Proportions for Portland-Cement Mortars and Concretes." J. A. Kitts. XVII, Part II, 279 (1917). Discussion, 295.

"Effect of Age on the Strength of Concrete." D. A. Abrams. XVIII, Part II, 317 (1918).

"Effect of Fineness of Cement." D. A. Abrams. XIX, Part II, 328 (1919). Discussion, 409.

"Effects of Grading of Sands and Consistency of Mix upon the Strength of Plain and Reinforced Concrete." L. N. Edwards. XVII, Part II, 301 (1917). Discussion, 358. XVIII, Part II, 303 (1918).

"Method and Apparatus for Determining Consistency." C. M. Chapman. XIII, 1045 (1913). Discussion, 1052.

"Properties of Cement-Lime-Sand Mortars." W. E. Emley. XVII, Part II, 261 (1917). Discussion, 273.

"Proportioning Aggregates for Portland-Cement Concrete." Albert Moyer. XIV, Part II, 255 (1914). Discussion, 267.

"Proportioning the Materials of Mortars and Concretes by Surface Areas of Aggregates." L. N. Edwards. XVIII, Part II, 235 (1918). Discussion, 284.

"Strength of Lime Mortar." W. E. Emley and S. E. Young. XIV, Part II, 338 (1914).

Tentative Specifications and Tests for Compressive Strength of Portland-Cement Mortars. XVII, Part I, 630 (1917); XVIII, Part I, 538 (1918); XIX, Part I, 533 (1919); XX, Part I, 599 (1920).

Tentative Specifications for:

Materials for Cement Grout Filler for Brick and Stone Block Pavement. XIX, Part I, 650 (1919).

Materials for Cement Mortar Bed for Brick, Stone Block and Wood Block Pavement. XIX, Part I, 652 (1919).

"Tests of Mortars Made from Wisconsin Aggregates." M. O. Withey. XIII, 834 (1913).

"The Effect of Finer Grinding and a Higher SO_3 Content Upon the Physical Properties of Portland Cement." P. H. Bates. XV, Part II, 126 (1915). Discussion, 150.

"Volume Changes in Portland Cement and Concrete." A. H. White. XIV, Part II, 203 (1914). Discussion, 242.

MUNTZ METAL.

See also **Alloys** (page 22).

"Fatigue of Copper Alloys." Ernst Jonson. XV, Part II, 101 (1915). Discussion, 109.

N

NICKEL.

See also **Alloys** (page 22).

Nomenclature of non-ferrous alloys. XX, Part I, 239 (1920).

"Some Tests of Light Aluminum Casting Alloys: The Effect of Heat Treatment." P. D. Merica and C. P. Karr. XIX, Part II, 297 (1919).

NICKEL STEEL.

"Effect of Size of Section on Physical Properties Developed by Heat Treatment." J. H. Nead. XIII, 489 (1913). Discussion, 525.

"Molybdenum as an Alloying Element in Structural Steels." G. W. Sargent. XX, Part II, 5 (1920). Discussion, 29.

"Some Fatigue Tests of Nickel Steel and Chrome-Nickel Steel." H. F. Moore and A. G. Gehrig. XIX, Part II, 206 (1919). Discussion, 219.

Tentative Revisions of Standard Specifications for Structural Nickel Steel. XX, Part I, 811 (1920).

"The Relation Between Maximum Strength, Brinell Hardness and Scleroscope Hardness in Treated and Untreated Alloy and Plain Steels." R. R. Abbott. XV, Part II, 42 (1915). Discussion, 60.

Topical Discussion on Magnetic Analysis: "A Systematic Investigation of the Correlation of the Magnetic and Mechanical Properties of Steel." N. J. Gebert. XIX, Part II, 117 (1919). Discussion, 136.

Topical Discussion on the Rôle of the Several Alloying Elements in the Alloy Steels: "The Rôle of Nickel." R. R. Abbott. XVII, Part II, 9 (1917). Discussion, 45.

NOMENCLATURE.

Definitions for pigments dry and in oil when marketed in the form. XVII, Part I, 458 (1917).

Discussion on nomenclature of non-ferrous metals and alloys. XX, Part I, 239 (1920).

Glossary of Terms Relating to Sewer Pipe. XIV, Part I, 202 (1914).

Nomenclature of non-ferrous alloys. XX, Part I, 239 (1920).

Proposed Definitions of Non-Bituminous Road Materials. XIV, Part I, 375 (1914); XV, Part I, 332 (1915).

Proposed Standard Definitions of Terms Applicable to Materials Relating to Roads and Pavements. XIV, Part I, 383 (1914); XV, Part I, 333 (1915).

Proposed Standard Definitions of Terms Used in Paint Specifications. XIII, 403 (1913); XIV, Part I, 224 (1914).

Report of Special Joint Committee Appointed to Consider Definitions of Road Materials. XV, Part I, 332 (1915).

Report on British standard nomenclature of bituminous materials. XVII, Part I, 476 (1917).

Report on proposed standard definitions of terms for road materials. XIII, 448 (1913).

Report on provisional definitions, tests and methods pertaining to non-bituminous road materials. XVII, Part I, 334 (1917).

Tentative Definitions and Rules Governing the Preparation of Micrographs of Metals and Alloys. XVII, Part I, 838 (1917); XVIII, Part I, 716 (1918); XIX, Part I, 768 (1919).

NOMENCLATURE (*Continued*).

Tentative Definitions of Clay-Refractories. XIX, Part I, 625 (1919).

Tentative Definitions of Terms Relating to Materials for Roads and Pavements. XVII, Part I, 836 (1917).

Tentative Definitions of Terms Relating to the Gypsum Industry. XVI, Part I, 42 (1916); XVII, Part I, 681 (1917); XVIII, Part I, 512 (1918); XIX, Part I, 628 (1919); XX, Part I, 658 (1920).

Tentative Definitions of Terms Relating to Wrought-Iron Specifications. XX, Part I, 526 (1920).

Tentative Revisions of Standard Definitions of Terms Relating to Materials for Roads and Pavements. XVI, Part I, 594 (1916).

NON-FERROUS METALS AND ALLOYS.

(Papers and reports on non-ferrous metals and alloys are indexed under the names of the various metals and alloys that appear as key words. For reports of the Committee on Non-Ferrous Metals and Alloys, see **Alloys** (page 22).)

O

OILS.

See also **Lubricants** (page 60).

"A New Hexabromide Test for Linseed Oil." L. L. Steel and F. M. Washburn. XX, Part I, 396 (1920).

Description of New Method for Determination of Hexabromide Number of Linseed Oil Fatty Acids. XIII, 393 (1913).

"Determination of Resistance of Lubricating Oils to Emulsification." V. R. Abrams, C. H. Osmond and T. G. Delbridge. XX, Part I, 416 (1920).

"Emulsification of Mineral Lubricating Oils: Apparatus and Test Method." P. H. Conradson. XVI, Part II, 273 (1916). Discussion, 280.

"Examination of Chinese Wood Oil." E. E. Ware and C. L. Schumann. XIV, Part II, 454 (1914). Discussion, 464.

Examination of special tung oils. XIV, Part I, 256 (1914).

Methods for determination of specific gravity of fractions of creosote oil. XVI, Part I, 337 (1916).

Preliminary Report Made in Compliance with the Department of State's Instruction Concerning the Sources of Lumbang and Perilla Oils. XVII, Part I, 375 (1917).

"Quantitative Test for Resistance of Lubricating Oils to Emulsification." W. H. Herschel. XVI, Part II, 248 (1916). Discussion, 266.

"Report on a Permeability Test for Paints and Varnishes." A. M. Muckenfuss. XIV, Part II, 359 (1914). Discussion, 426.

Report on evaporation tests of lubricating oil. XVIII, Part I, 323 (1918).

Report on sulfur determination in lubricants. XX, Part I, 407 (1920).

Report on water sampling in creosote oil. XVI, Part I, 328 (1916).

Reports of Analysts on Lumbang and Perilla Oils. XVII, Part I, 366 (1917).

Reports on linseed oil:

A test for determination of foots and reports of analysts. XVII, Part I, 377 (1917).

Results of foots tests on raw linseed oil and reports of analysts. XVIII. Part I, 299 (1918).

Results of tests on raw and boiled linseed oil and comments of analysts. XV, Part I, 224 (1915).

Results of tests on South American and India seed and comments of analysts XIII, 372 (1913).

Results of tests on South American seed and comments of analysts. XVI, Part I, 283 (1916).

OILS (*Continued*).

"Some Experiments on Technical Bitumens." S. R. Church and J. M. Weiss. XV, Part II, 274 (1915). Discussion, 294.

"Some Relations Between the Characteristics of Steam-Distilled Petroleum Residuals." B. A. Anderton. XX, Part II, 298 (1920). Discussion, 312.

Standard Specifications for the Purity of Raw Linseed Oil from North American Seed. XIII, 399 (1913).

"Supplementary Report on Density and Thermal Expansion of Linseed Oil." H. W. Bearce and E. L. Peffer. XIV, Part I, 262 (1914).

Tentative Methods for:

Analysis of Creosote Oil. XVII, Part I, 826 (1917).

Sampling and Analysis of Creosote Oil. XVI, Part I, 564 (1916).

Tentative Revisions of Standard Specifications for Purity of Raw Tung Oil. XX, Part I, 819 (1920).

Tentative Specifications for:

Creosote Oil for Priming Coat with Coal-Tar Pitch for Use in Damp-Proofing and Waterproofing. XVII, Part I, 721 (1917); XVIII, Part I, 639 (1918); XIX, Part I, 678 (1919); XX, Part I, 725 (1920).

Foots Permissible in Properly Clarified Pure Raw Linseed Oil from North American Seed. XVIII, Part I, 615 (1918); XIX, Part I, 648 (1919); XX, Part I, 678 (1920).

Tentative Tests for:

Loss on Heating of Oil and Asphaltic Compounds. XIX, Part I, 732 (1919).

Specific Gravity of Road Oils, Road Tars, Asphalt Cements and Soft Tar Pitches. XX, Part I, 764 (1920).

"Testing of Chinese Wood Oil." E. W. Boughton. XIII, 923 (1913). Discussion, 942.

Tests on Chinese wood oils. XIV, Part I, 237 (1914).

Tests on commercial Chinese wood oil and oil mixtures. XV, Part I, 204 (1915).

Tests on perilla oil. XVI, Part I, 273 (1916).

Tests on soya bean oils. XIII, 350 (1913).

Tests on special American Chinese wood oils. XV, Part I, 211 (1915).

Tests on tung oils. XIII, 351 (1913); XX, Part I, 390 (1920).

"The Acceptability of Linseed Oil." C. D. Holley. XVI, Part II, 239 (1916). Discussion, 246.

"The So-Called Asphalt Content of Road Oils." B. A. Anderton and D. G. Taylor. XX, Part II, 314 (1920). Discussion, 320.

"Viscosity Measurement and a New Viscosimeter." A. E. Flowers. XIV, Part II, 565 (1914).

Work on hexabromide values of linseed oil. XX, Part I, 395 (1920).

OPEN HEARTH.

See **Steel** (page 87).

ORGANIC IMPURITIES IN CONCRETE.

See **Colorimetric Tests** (page 40).

OVERSTRAIN.

"Are the Effects of Simple Overstrain Monotropic?" H. M. Howe. XIV, Part II, 7 (1914). Discussion, 36.

OXYGEN.

"Oxygen in Iron and Steel: Value of Existing Methods for Its Determination." W. R. Fleming. XIII, 477 (1913). Discussion, 487.

P

PAINTS.

See also **Oils** (page 65); **Preservative Coatings** (page 70).

Analysis of Red Lead. XIV, Part I, 281 (1914).

Analysis of White Pigments. XIV, Part I, 269 (1914).

"A New Colorimeter for White Pigments and Some Results Obtained by Its Use." A. H. Pfund. XX, Part II, 440 (1920). Discussion, 449.

"An Instrument for Measuring the Hiding Power of Paints." R. L. Hallett. XX, Part II, 426 (1920). Discussion, 436.

Definitions for pigments dry and in oil when marketed in the form. XVII, Part I, 458 (1917).

Flash point of paint thinners other than turpentine. XVII, Part I, 402 (1917).

"Fungi Occurring on the White-Paint Test Fence at Washington, D. C." Vera K. Charles. XV, Part I, 257 (1915).

"Further Development of the Plastometer and Its Practical Application to Research and Routine Problems." Henry Green. XX, Part II, 451 (1920). Discussion, 483.

Hiding power of paint. XVII, Part II, 502 (1917).

"Metal Primer Tests." H. A. Gardner. XVII, Part II, 531 (1917). Discussion, 539.

"Optical Properties and Theory of Color of Pigments and Paints." H. E. Merwin. XVII, Part II, 494 (1917). Discussion, 527.

"Outline of a Test for Indicating the Relative Priming and Top-Coat Values of Different Paints." M. McNaughton. XIII, 947 (1913). Discussion, 954.

"Paint, a Plastic Material and not a Viscous Liquid; the Measurement of its Mobility and Yield Value." E. C. Bingham and Henry Green. XIX, Part II, 640 (1919). Discussion, 665.

"Paint Protection for Portland-Cement Surfaces." H. A. Gardner. XIV, Part II, 482 (1914). Discussion, 491.

Proposed Standard Definitions of Terms Used in Paint Specifications. XIII, 403 (1913); XIV, Part I, 224 (1914).

Record of preparation and painting of surfaces. XVII, Part I, 454 (1917).

Report of U. S. Bureau of Standards on Tag Closed Testers. XIX, Part I, 367 (1919).

"Report on a Permeability Test for Paints and Varnishes." A. M. Muckenfuss. XIV, Part II, 359 (1914). Discussion, 426.

Report on methods of analysis of paint materials. XIV, Part I, 267 (1914).

Report on paint thinners other than turpentine. XIV, Part I, 312 (1914); XV, Part I, 290 (1915); XVI, Part I, 290 (1916).

Report on preparation of iron and steel surfaces for painting. XVI, Part I, 293 (1916); XVII, Part I, 451 (1917); XVIII, Part I, 310 (1918); XIX, Part I, 374 (1919).

Report on specifications for sampling of liquids. XV, Part I, 267 (1915).

Report on terms used in reporting the service conditions of painted surfaces. XIX, Part I, 384 (1919).

Report on testing of paint vehicles. XV, Part I, 204 (1915). XVI, Part I, 273 (1916); XVII, Part I, 365 (1917); XX, Part I, 390 (1920).

Report on the testing of white paints. XIII, 406 (1913).

Reports on Atlantic City steel plate paint tests. XIII, 369 (1913); XIV, Part I, 259 (1914); XV, Part I, 214 (1915).

Reports on inspection of the Havre de Grace Bridge. XIII, 332 (1913); XIV, Part I, 232 (1914); XV, Part I, 189 (1915).

Reports on inspection of white-paint test fence at Washington, D. C. XIV, Part I, 287 (1914); XV, Part I, 239 (1915).

PAINTS (*Continued*).

Standardization of tag closed tester by the U. S. Bureau of Standards. XIX, Part I, 364 (1919).

Tentative Methods for Routine Analysis of:

Dry Red Lead. XVII, Part I, 796 (1917).

White Pigments. XVI, Part I, 536 (1916).

Yellow, Orange, Red, and Brown Pigments Containing Iron and Manganese. XVII, Part I, 802 (1917).

Tentative Tests for:

Flash Point for Paint Thinners Other than Turpentine. XVIII, Part I, 685 (1918).

Paint Thinners Other than Turpentine. XVI, Part I, 518 (1916).

PAPERS.

See **Publications** (page 72).

PARTITIONS.

See **Fireproofing** (page 51).

PAVING.

See **Bituminous Materials** (page 29); **Brick** (page 31); **Concrete** (page 41); **Road Materials** (page 76).

PENETRATION.

See also **Bituminous Materials** (page 29).

Proposed Test for Penetration of Bituminous Materials. XV, Part I, 352 (1915)

Report of Collaborative Tests of Sectional Committee on Penetration Relative to Modification of the Standard Needle. XX, Part I, 435 (1920).

Report on penetration of bituminous materials. XV, Part I, 352 (1915); XVI, Part I, 306 (1916).

PERILLA OIL.

Preliminary Report Made in Compliance with the Department of State's Instruction Concerning the Sources of Lumbang and Perilla Oils. XVII, Part I, 375 (1917).

Reports of Analysts on Lumbang and Perilla Oils. XVII, Part I, 366 (1917).

Tests on perilla oil. XVI, Part I, 273 (1916).

PETROLEUM.

See **Bituminous Materials** (page 29); **Lubricants** (page 60); **Oils** (page 65).

PHOSPHORUS.

Discussion on phosphorus and sulfur in steel. XVIII, Part I, 136 (1918).

Phosphorus in Coal Ash. XIV, Part I, 434 (1914).

Preliminary Program of Tests Adopted by the Joint Committee on Investigation of Phosphorus and Sulfur in Steel. XX, Part I, 139 (1920).

PIG LEAD.

See **Lead** (page 58).

PIGMENTS.

See also **Paints** (page 67).

"A New Colorimeter for White Pigments and Some Results Obtained by Its Use." A. H. Pfund. XX, Part II, 440 (1920). Discussion, 449.

Definitions for pigments dry and in oil when marketed in the form. XVII, Part I, 458 (1917).

"Optical Properties and Theory of Color of Pigments and Paints." H. E. Merwin. XVII, Part II, 494 (1917). Discussion, 527.

"Report on a Permeability Test for Paints and Varnishes." A. M. Muckenfuss. XIV, Part II, 359 (1914). Discussion, 426.

PIGMENTS (*Continued*).
Tentative Methods for Routine Analysis of:
Dry Red Lead. XVII, Part I, 796 (1917).
White Pigments. XVI, Part I, 536 (1916).
Yellow, Orange, Red, and Brown Pigments Containing Iron and Manganese. XVII, Part I, 802 (1917).

PIPE.
See also **Drain Tile** (page 48); **Sewer Pipe** (page 82).
Discussion on cast-iron soil pipe. XVII, Part I, 135 (1917).
"Method for Testing the Durability of Pipe under Corrosion." F. N. Speller. XVI, Part II, 343 (1916). Discussion, 346.
Proposals for International Export Specifications for Cast-Iron Pipe and Fittings. XIV, Part I, 157 (1914).
Reports of the Committee on Revision of Pipe Threads:
Report of investigation on tolerances and gages for pipe threads. XVII, Part I, 504 (1917).
Reporting the transfer of the work of the committee to a committee under the auspices of the American Society of Mechanical Engineers. XVIII, Part I, 422 (1918).
Tentative Revisions of Standard Specifications for:
Welded Steel Pipe. XX, Part I, 812 (1920).
Welded Wrought-Iron Pipe. XX, Part I, 813 (1920).
Tentative Specifications for:
Cast-Iron Soil Pipe and Fittings. XVII, Part I, 576 (1917).
Welded Steel Pipe. XX, Part I, 487 (1920).
Wrought-Iron Pipe. XVII, Part I, 568 (1917).
Topical Discussion on Season and Corrosion Cracking of Brass: "Season Cracking and Splitting of Condenser Tubes and Pipes." William Campbell. XVIII, Part II, 147 (1918). Discussion, 201.

PITCHES.
See **Bituminous Materials** (page 29).

PLASTIC DEFORMATION.
See also **Consistency** (page 44); **Penetration** (page 68); **Softening Point** (page 84); **Viscosity** (page 105).
"Further Development of the Plastometer and Its Practical Application to Research and Routine Problems." Henry Green. XX, Part II, 451 (1920). Discussion, 483.
"Method for Studying the Effects of Temperature upon the Physical Condition of Asphalts, Waxes, Etc." J. A. Capp and F. A. Hull. XVII, Part II, 627 (1917). Discussion, 635.
"Paint, a Plastic Material and Not a Viscous Liquid; the Measurement of its Mobility and Yield Value." E. C. Bingham and Henry Green. XIX, Part II, 640 (1919). Discussion, 665.
"Some Experiments on the Plastic Elongation of Wire." A. V. de Forest. XVI, Part II, 455 (1916). Discussion, 465.

PLATES.
See also **Steel, Reports of Committee** (page 89); **Wrought Iron** (page 108).
Permissible variations in weight and gage of sheared plates. XIV, Part I, 100 (1914).
Report on Permissible Variations in Weight and Gage of Sheared Plates. XIV, Part I, 125 (1914).
Report on specifications for plates for forge welding. XIX, Part I, 150 (1919).
Standard Specifications for Wrought-Iron Plates. XIII, 185 (1913).

PLATES (*Continued*).

Tentative Specifications for:

Copper Plates for Locomotive Fireboxes. XVI, Part I, 437 (1916); XVII, Part I, 588 (1917).

Steel Plates for Forge Welding. XIX, Part I, 448 (1919); XX, Part I, 512 (1920).

Steel Tie Plates. XVI, Part I, 414 (1916); XVII, Part I, 541 (1917); XVIII, Part I, 445 (1918); XIX, Part I, 429 (1919); XX, Part I, 493 (1920).

PLYWOOD.

"The Uses and Properties of Water-Resistant Plywood." Armin Elmendorf. XX, Part II, 324 (1920).

PORCELAIN.

"Testing of Porosity of Electrical Porcelain." W. D. A. Peaslee. XX, Part II, 495 (1920).

PORTLAND CEMENT.

See **Cement** (page 35).

PRESERVATIVE COATINGS.

See also **Oils** (page 65); **Paints** (page 67).

Determination of zinc coatings. XVII, Part I, 144 (1917).

"Metal Primer Tests." H. A. Gardner. XVII, Part II, 531 (1917). Discussion, 539.

"Quantitative Determination of Body and Solvent in Varnish." A. L. Brown. XIV, Part II, 466 (1914).

"Report on a Permeability Test for Paints and Varnishes." A. M. Muckenfuss. XIV, Part I, 359 (1914). Discussion, 426.

Tentative Methods for Routine Analysis of:

Dry Red Lead. XVII, Part I, 796 (1917).

White Pigments. XVI, Part I, 536 (1916).

Yellow, Orange, Red, and Brown Pigments Containing Iron and Manganese. XVII, Part I, 802 (1917).

Tentative Specifications for Foots Permissible in Properly Clarified Pure Raw Linseed Oil from North American Seed. XVIII, Part I, 615 (1918); XIX, Part I, 648 (1919); XX, Part I, 678 (1920).

PRESERVATIVE COATINGS, REPORTS OF COMMITTEE.

Reports of the Committee on Preservative Coatings for Structural Materials:

Submitting standard specifications for the purity of raw linseed oil from North American seed; Proposed Standard Definitions of Terms Used in Paint Specifications. Transmitting reports of sub-committees on: Inspection of the Havre de Grace Bridge; Paint Vehicles; Turpentine; the Atlantic City Steel Paint Tests; Linseed Oil; Definitions of Terms Used in Paint Specifications; the Testing of White Paints. XIII, 329 (1913).

Submitting proposed standard definitions of terms used in paint specifications; proposed specifications for turpentine. Presenting Regulations Governing Committee D-1. Submitting reports of sub-committees on: Inspection of the Havre de Grace Bridge; Testing of Paint Vehicles; Inspection of Steel Plates at Atlantic City; Linseed Oil; Methods of Analysis of Paint Materials; Inspection of White-Paint Test Fence at Washington, D. C.; Paint Thinners Other than Turpentine; Turpentine; Shellac. Submitting supplementary reports on: "Density and Thermal Expansion of Linseed Oil," by H. W. Bearce and E. L. Peffer; "Density and Thermal Expansion of Turpentines," by H. W. Bearce; "Refractive Indices of Turpentine," by E. D. Tillyer; "Color of Turpentines," by I. G. Priest. XIV, Part I, 221 (1914). Discussion, 351.

PRESERVATIVE COATINGS, REPORTS OF COMMITTEE (*Continued*).

Reports of the Committee on Preservative Coatings for Structural Materials (*Continued*):

Submitting revisions of Standard Specifications for: Purity of Raw Linseed Oil from North American Seed. Recommending for adoption specifications for: purity of raw chinese wood oil; purity of boiled linseed oil from North American seed; turpentine; definitions of terms used in paint specifications. Submitting as tentative tests for: distillation of paint thinners other than turpentine; moisture in bleached shellac; and tentative methods for: routine analysis of white pigments. Submitting reports of sub-committees on: Inspection of the Havre de Grace Bridge; Paints Used in Havre de Grace Bridge; Testing of Paint Vehicles; Inspection of Steel Plates at Atlantic City; Linseed Oil; Definitions of Terms Used in Paint Specifications; Methods of Analysis of Paint Materials; Inspection of White-Paint Test Fence at Washington, D. C.; Paint Thinners Other than Turpentine; Turpentine; Shellac; Specifications for Sampling of Liquids. XV, Part I, 186 (1915). Discussion, 270.

Submitting revisions of the Standard Specifications for Purity of Raw Chinese Wood Oil. Submitting as tentative tests for: paint thinners other than turpentine; shellac; methods for routine analysis of white pigments. Submitting reports of sub-committee on: Testing of Paint Vehicles; Linseed Oil; Paint Thinners Other than Turpentine; Shellac; Preparation of Iron and Steel Surfaces for Painting. XVI, Part I, 270 (1916).

Recommending for adoption as standard methods for routine analysis of white pigments; tests for paint thinners other than turpentine; tests for shellac. Submitting as tentative methods for routine analysis of dry red lead; methods for routine analysis of yellow, orange, red and brown pigments containing iron and manganese. Transmitting reports of sub-committees on: Testing of Paint Vehicles; Linseed Oil; Methods of Analysis of Paint Materials; Varnish; Paint Thinners Other than Turpentine; Preparation of Iron and Steel Surfaces for Painting; Specifications for Pigments Dry and in Oil when Marketed in the Form. XVII, Part I, 363 (1917). Addendum, 460.

Recommending for adoption as standard methods for: routine analysis of dry red lead; routine analysis of yellow, orange, red, and brown pigments containing iron and manganese. Submitting as tentative specifications for foots permissible in properly clarified pure raw linseed oil from North American seed; tests for flash point of paint thinners other than turpentine. Transmitting reports of sub-committees on: Linseed Oil; Methods of Analysis of Paint Materials; Varnish; Paint Thinners Other than Turpentine; Preparation of Iron and Steel Surfaces for Painting. XVIII, Part I, 297 (1918).

Recommending for adoption as standard tentative tests for flash point of volatile paint thinners. Transmitting reports of sub-committees on: Testing of Paint Vehicles; Paint Thinners Other than Turpentine; Turpentine; Preparation of Iron and Steel Surfaces for Painting; Terms Used in Reporting the Service Conditions of Painted Surfaces. XIX, Part I, 361 (1919).

Submitting revisions of the Standard Specifications for Purity of Raw Tung Oil. Recommending for adoption as standard specifications for turpentine. Transmitting report of Sub-Committees on: Testing of Paint Vehicles; Turpentine. XX, Part I, 387 (1920).

PRESERVATIVES.

See also **Creosote Oil** (page 47).

"A Fungus Bed Test of Wood Preservatives." C. M. Chapman. XV, Part II, 267 (1915).

PRESSURES.

"A Laboratory Method of Determining Pressures on Walls and Bins." J. Hammond Smith. XV, Part II, 382 (1915). Discussion, 395.

"An Apparatus for Determining Soil Pressures." A. T. Goldbeck and E. B. Smith. XVI, Part II, 309 (1916).

"Distribution of Pressures Through Earth Fills." A. T. Goldbeck. XVII, Part II, 640 (1917). Discussion, 655.

PRIMERS.

See **Paints** (page 67).

PROPORTIONAL LIMIT.

See **Elastic Limit** (page 49).

PROTECTIVE COATINGS.

See also **Paints** (page 67); **Preservative Coatings** (page 70).

"A New Method of Testing Galvanized Coatings." A. S. Cushman. XX, Part II, 411 (1920). Discussion, 422.

A new method of testing zinc coatings. XIX, Part I, 179 (1919).

"A Rational Test for Metallic Protective Coatings." J. A. Capp. XIV, Part II, 474 (1914). Discussion, 479.

Determination of zinc coatings. XVII, Part I, 144 (1917).

"Electrolytic Determination of Tin on Tinned Copper Wire." G. G. Grower. XVII, Part II, 129 (1917). Discussion, 153.

"Method of Making the Salt-Spray Corrosion Test." A. N. Finn. XVIII, Part I, 237 (1918).

"Method of Sampling and Analysis of Tin, Terne and Lead-Coated Sheets." J. A. Aupperle. XIV, Part II, 162 (1914). Discussion, 169.

"Structure of Commercial Zinc Coatings." H. S. Rawdon. XVIII, Part I, 216 (1918).

"The Determination of Spelter Coating on Sheets and Wire." J. A. Aupperle. XV, Part II, 119 (1915). Discussion, 124.

PUBLICATIONS.

Reports of the Committee on Papers and Publications:

Organization. Transmitting Regulations Governing Papers, Committee Reports and Publications. XIII, 472 (1913).

Progress report. XIV, Part I, 463 (1914).

Progress report. XV, Part I, 466 (1915).

Transmitting statistics of preprints. XVI, Part I, 404 (1916).

Transmitting statistics of preprints. Discussing regulations concerning: distribution of committee reports affecting standards; sub-committee reports; editing of committee reports; letter ballot on committee reports. XVII, Part I, 529 (1917).

Transmitting statistics of preprints. XVIII, Part I, 440 (1918).

Transmitting statistics of preprints. XIX, Part I, 424 (1919).

Transmitting statistics of preprints. Submitting suggestions for reorganization of committee. XX, Part I, 481 (1920).

Q

QUICKLIME.

See **Lime** (page 58).

R

RAILS.

"Condensed Report of the Investigation of Reinforcing Bars Rerolled from Steel Rails." W. K. Hatt. XIII, 96 (1913).

RAILS (*Continued*).

"Deep Etching of Rails and Forgings." F. M. Waring and K. E. Hofammann. XIX, Part II, 182 (1919). Discussion, 189.

Discussion on deep etching of rails and forgings. XIX, Part II, 189 (1919).

Discussion on finishing temperatures of rails. XV, Part I, 115 (1915).

Estimation of segregation by means of Brinell hardness tests made at center and outside of a transverse section of the rail. XVI, Part I, 93 (1916).

Estimation of segregation by means of chemical analysis of center and outside of rail. XVI, Part I, 93 (1916).

Estimation of segregation by the appearance of the transversely fractured section of the rail. XVI, Part I, 93 (1916).

Finishing temperatures for rails. XV, Part I, 82 (1915).

"On the Shattered Zones in Certain Steel Rails, with Notes on the Interior Origin of Transverse Fissures." J. E. Howard. XX, Part II, 44 (1920). Discussion, 60.

"Our Rail Specifications." Address by the President, A. W. Gibbs, at the Eighteenth Annual Meeting. XV, Part I, 32 (1915).

"Rail Failures and Their Causes." M. H. Wickhorst. XIII, 582 (1913). Discussion, 594.

Report on Finishing Temperatures of Rails. XV, Part I, 91 (1915).

"Some Applications of Magnetic Analysis to the Study of Steel Products." C. W. Burrows. XVII, Part II, 87 (1917). Discussion, 105.

Standard Specifications for Rail-Steel Concrete Reinforcement Bars. XIII, 153 (1913).

Tentative Revisions of Standard Specifications for Open-Hearth Steel Girder and High Tee Rails. XIX, Part I, 777 (1919); XX, Part I, 809 (1920).

The Rail Situation. XVII, Part I, 111 (1917); XVIII, Part I, 126 (1918).

Topical Discussion on Magnetic Analysis:

"Magnetic Analysis as a Criterion of the Quality of Steel and Steel Products." C. W. Burrows and F. P. Fahy. XIX, Part II, 5 (1919). Discussion, 136.

"Magnetic Surveys on New and Failed Rails." P. H. Dudley. XIX, Part II, 51 (1919). Discussion, 136.

Transverse fissures in rails. XVI, Part I, 94 (1916).

RECRYSTALLIZATION.

"Recrystallization as a Factor in the Failure of Boiler Tubes." A. E. White and H. F. Wood. XVI, Part II, 80 (1916). Discussion, 111.

REFRACTORIES.

"Practical Methods for Testing Refractory Fire Brick." C. E. Nesbitt and M. L. Bell. XVI, Part II, 349 (1916). Discussion, 373.

"Preventable Defects in Refractory Bricks." C. E. Nesbitt and M. L. Bell XIX, Part II, 619 (1919). Discussion, 630.

Reports of the Committee on Refractories:

Submitting as tentative methods for: ultimate chemical analysis of refractory materials; test for refractory materials under load at high temperatures; test for slagging action of refractory materials. Transmitting paper on "Slag Test for Refractory Brick Used in the Iron and Steel Industry," by C. E. Nesbitt and M. L. Bell. XVII, Part I, 313 (1917).

Submitting revisions of the Standard Methods for Ultimate Chemical Analysis of Refractory Materials; Tentative Test for Refractory Materials Under Load at High Temperatures. Submitting as tentative method for determination of porosity and permanent volume changes in refractory materials. XVIII, Part I, 287 (1918).

REFRACTORIES (*Continued*).

Reports on the Committee on Refractories (*Continued*):

Submitting as tentative tests for: determination of softening point of fire-clay brick; slagging action of refractory materials; definitions for clay refractories. XIX, Part I, 315 (1919).

Submitting as tentative method for ultimate chemical analysis of chrome ores and chrome brick. Recommending for adoption as standard tests for: softening point of fire-clay brick; porosity and permanent volume changes in refractory materials; refractory materials under load at high temperatures; methods for the ultimate chemical analysis of refractory materials; definitions for clay refractories. Transmitting paper on "Vital Factors in the Testing of Fire-Clay Refractories and in the Interpretation of Results," by R. M. Howe. XX, Part I, 275 (1920).

"Silica Cement." R. J. Montgomery. XVIII, Part II, 350 (1918).

"Slag Test for Refractory Brick Used in the Iron and Steel Industry." C. E. Nesbitt and M. L. Bell. XVII, Part I, 314 (1917).

"Suggested Improvements in the Manufacture of Silica Brick." C. E. Nesbitt and M. L. Bell. XVII, Part II, 467 (1917). Discussion, 483.

Tentative Definitions of Clay Refractories. XIX, Part I, 625 (1919).

Tentative Methods for:

Determination of Porosity and Permanent Volume Changes in Refractory Materials. XVIII, Part I, 588 (1918); XIX, Part I, 590 (1919).

Ultimate Chemical Analysis of Chrome Ores and Chrome Brick. XX, Part I, 647 (1920).

Ultimate Chemical Analysis of Refractory Materials. XVII, Part I, 671 (1917); XVIII, Part I, 580 (1918); XIX, Part I, 605 (1919).

Tentative Revisions of Standard Methods for Ultimate Chemical Analysis of Refractory Materials. XX, Part I, 818 (1920).

Tentative Tests for:

Determination of Softening Point of Fire-Clay Brick. XIX, Part I, 594 (1919).

Refractory Materials under Load at High Temperatures. XVII, Part I, 665 (1917); XVIII, Part I, 573 (1918); XIX, Part I, 581 (1919).

Slagging Action of Refractory Materials. XVII, Part I, 669 (1917); XVIII, Part I, 578 (1918); XIX, Part I, 586 (1919); XX, Part I, 620 (1920).

"Testing of Refractories." A. V. Bleininger. XIII, 967 (1913).

"The Necessity for Inspection and Testing of Refractory Brick." C. E. Nesbitt and M. L. Bell. XVIII, Part II, 336 (1918). Discussion, 346.

"Vital Factors in the Testing of Fire-Clay Refractories and in the Interpretation of Results." R. M. Howe. XX, Part I, 278 (1920).

REGULATIONS.

Regulations Governing Committee A-1. XIV, Part I, 104 (1914).

Regulations Governing Committee C-1. XIV, Part I, 183 (1914).

Regulations Governing Committee D-1. XIV, Part I, 227 (1914).

Regulations Governing Committee D-13. XVIII, Part I, 365 (1918).

Revisions of Regulations Governing Standing Committees. XVI, Part I, 395 (1916); XVII, Part I, 516 (1917); XVIII, Part I, 429 (1918).

Revisions of Regulations Governing Technical Committees. XIII, 470 (1913); XIV, Part I, 457 (1914); XV, Part I, 458 (1915).

REINFORCED CONCRETE.

See **Concrete, Reinforced** (page 43).

REINFORCEMENT BARS.

"Condensed Report of the Investigation of Reinforcing Bars Rerolled from Steel Rails." W. K. Hatt. XIII, 96 (1913).

Discussion on steel reinforcement bars. XIII, 169 (1913).

Standard Specifications for Rail-Steel Concrete Reinforcement Bars. XIII, 153 (1913).

"The Strength of Clamped Splices in Concrete Reinforcement Bars." E. L. Lasier. XVI, Part II, 209 (1916). Discussion, 233.

"The Use of Turned Sections in Tension Tests of Reinforcing Bars." E. P. Withrow and L. C. Niedner. XIV, Part II, 90 (1914). Discussion, 107.

REPEATED STRESS.

See also **Fatigue** (page 50).

"A High-Speed Alternating Torsion Testing Machine." D. J. McAdam, Jr. XX, Part II, 366 (1920). Discussion, 371.

"Aluminum Bronze: Some Recent Tests and Their Significance." W. M. Corse and G. F. Comstock. XVI, Part II, 117 (1916). Discussion, 145.

"An Alternating Torsion Testing Machine." D. J. McAdam, Jr. XVII, Part II, 599 (1917).

"Are the Effects of Simple Overstrain Monotropic?" H. M. Howe. XIV, Part II, 7 (1914). Discussion, 36.

"Constants and Diagrams for Repeated Stress Calculations." H. F. Moore and F. B. Seely. XVI, Part II, 470 (1916).

Discussion on repeated stress. XV, Part II, 463 (1915).

"Endurance and Impact Tests of Metals." D. J. McAdam, Jr. XVI, Part II, 292 (1916). Discussion, 307.

"Some Determinations of the Stress-Deformation Relations for Concretes under Repeated and Continuous Loadings." G. M. Williams. XX, Part II, 233 (1920). Discussion, 250.

"Some Tests of Light Aluminum Casting Alloys: The Effect of Heat Treatment." P. D. Merica and C. P. Karr. XIX, Part II, 297 (1919).

"The Failure of Materials Under Repeated Stress." H. F. Moore and F. B. Seely. XV, Part II, 437 (1915). Discussion, 463.

RESEARCH.

"Further Development of the Plastometer and Its Practical Application to Research and Routine Problems." Henry Green. XX, Part II, 451 (1920). Discussion, 483.

Research and its bearing upon standardization. XIX, Part I, 84 (1919).

"The Relation Between Research and the Activities of the Society." Address by the President, A. N. Talbot, at the Seventeenth Annual Meeting. XIV, Part I, 31 (1914).

Topical Discussion on Cooperation in Industrial Research:

"Cooperation Between Governmental Bureaus and the Industries on Research on War Problems." S. R. Church. XVIII, Part II, 66 (1918).

"Cooperation of the Portland Cement Association and Lewis Institute in Experimental Studies of Concrete." D. A. Abrams. XVIII, Part II, 56 (1918).

"Cooperative Research in the American Canning Industry." F. E. Gorrell. XVIII, Part II, 40 (1918).

"Development of Existing Agencies." A. D. Flinn. XVIII, Part II, 43 (1918).

"Developments in Industrial Research." C. L. Reese. XVIII, Part II, 32 (1918).

General Introduction. H. M. Howe. XVIII, Part II, 8 (1918).

Laboratories Engaged in Industrial Research Partly or Wholly. XVIII, Part II, 47 (1918).

RESEARCH (*Continued*).

Topical Discussion on Cooperation in Industrial Research (*Continued*):

Opening Announcement. Edgar Marburg. XVIII, Part II, 5 (1918).

"Organization of Industrial Research." A. D. Little. XVIII, Part II, 22 (1918).

"Recent Developments in Great Britain." John Johnston. XVIII, Part II, 12 (1918).

"Some Practical Views of Research." J. S. Unger. XVIII, Part II, 62 (1918).

RIVET STEEL.

See **Steel** (page 87).

ROAD MATERIALS.

See also **Bituminous Materials** (page 29); **Brick** (page 31); **Concrete** (page 41).

"An Abrasion Test for Stone, Gravel and Similar Aggregates." H. H. Scofield. XVIII, Part II, 416 (1918). Discussion, 426.

Discussion on wearing properties. XVI, Part II, 203 (1916).

Discussion on wooden paving blocks. XVIII, Part I, 340 (1918).

"Effect of Controllable Variables on the Toughness Test for Rock." F. H. Jackson, Jr. XVII, Part II, 571 (1917). Discussion, 586.

"Impact Test on Concrete to Regulate Coarse and Fine Aggregate Qualities and Mixes for Highways." H. S. Mattimore. XX, Part II, 266 (1920). Discussion, 277.

Proposed Definitions of Non-Bituminous Road Materials. XIV, Part I, 375 (1914). XV, Part I, 332 (1915).

Proposed Provisional Method for:

Making a Mechanical Analysis of Broken Stone or Broken Slag. XIV, Part I, 381 (1914).

Making a Mechanical Analysis of Mixtures of Sand or Other Fine Material with Broken Stone or Broken Slag. XIV, Part I, 382 (1914).

Proposed Provisional Test for:

The Determination of the Absorption of Water per Cubic Foot of Rock. XIV, Part I, 379 (1914).

The Determination of the Apparent Specific Gravity of Rock. XIV, Part I, 378 (1914).

Proposed Standard Definitions of Terms Applicable to Materials Relating to Roads and Pavements. XIV, Part I, 383 (1914). XV, Part I, 333 (1915.)

"Relation Between the Tests for the Wearing Qualities of Road-Building Rocks." L. W. Page. XIII, 983 (1913). Discussion, 993.

Report on provisional definitions, tests and methods pertaining to non-bituminous road materials. XVII, Part I, 334 (1917).

Report of Special Joint Committee Appointed to Consider Definitions of Road Materials. XV, Part I, 332 (1915).

Report of Special Joint Committee Appointed to Consider Provisional Tests of Road Materials. XV, Part I, 338 (1915).

Report on proposed standard definitions of terms for road materials. XIII, 448 (1913).

"Some Relations Between the Characteristics of Steam-Distilled Petroleum Residuals." B. A. Anderton. XX, Part II, 298 (1920). Discussion, 312.

Tentative Definitions of Terms Relating to Materials for Roads and Pavements. XVII, Part I, 836 (1917).

Tentative Methods for:

Determination of Softening Point of Bituminous Materials Other than Tar Products. XVI, Part I, 549 (1916); XVII, Part I, 811 (1917). XVIII, Part I, 707 (1918).

ROAD MATERIALS (*Continued*).

Tenative Methods for (*Continued*):

Determination of Softening Point of Tar Products (Cube-in-Water Method). XIX, Part I, 764 (1919).

Form of Specifications for Certain Commercial Grades of Broken Stone. XVI, Part I, 548 (1916); XVII, Part I, 810 (1917).

Sampling of Stone, Slag, Gravel, Sand and Stone Block for Use as Highway Materials, Including Some Material Survey Methods. XX, Part I, 789 (1920).

Tentative Revisions of:

Standard Definitions of Terms Relating to Materials for Roads and Pavements. XVI, Part I, 594 (1916).

Standard Methods for Distillation of Bituminous Materials Suitable for Road Treatment. XVII, Part I, 474 (1917).

Tentative Specifications for:

Block for Granite Block Pavements. XIX, Part I, 654 (1919); XX, Part I, 690 (1920).

Broken Slag for Waterbound Base. XX, Part I, 698 (1920).

Commercial Sizes of Broken Stone and Broken Slag for Highway Construction. XX, Part I, 693 (1920).

Commercial Sizes of Sand and Gravel for Highway Construction. XX, Part I, 696 (1920).

Materials for Cement Grout Filler for Brick and Stone Block Pavement. XIX, Part I, 650 (1919).

Materials for Cement Mortar Bed for Brick, Stone Block and Wood Block Pavement. XIX, Part I, 652 (1919).

Natural or Artificial Sand-Clay Mixtures for Highway Surfacing. XX, Part I, 702 (1920).

Shovel-Run or Crusher-Run Broken Slag for Waterbound Base. XX, Part I, 700 (1920).

Wooden Paving Blocks for Exposed Pavements. XVIII, Part I, 625 (1918); XIX, Part I, 664 (1919).

Workability of Concrete for Concrete Pavements. XX, Part I, 692 (1920).

Tentative Tests for:

Determination of Apparent Specific Gravity of Coarse Aggregates. XVII, Part I, 776 (1917).

Determination of Apparent Specific Gravity of Homogeneous Coarse Aggregates. XVI, Part I, 529 (1916).

Determination of Apparent Specific Gravity of Sand, Stone, and Slag Screenings, and Other Fine Non-Bituminous Highway Materials. XVIII, Part I, 689 (1918).

Quantity of Clay and Silt in Gravel for Highway Construction. XX, Part I, 770 (1920).

Quantity of Clay and Silt in Sand for Highway Construction. XX, Part I, 774 (1920).

Quantity of Clay in Sand-Clay, Topsoil and Semi-Gravel for Highway Construction. XX, Part I, 772 (1920).

Specific Gravity of Asphalts and Tar Pitches Sufficiently Solid to be Handled in Fragments. XX, Part I, 767 (1920).

Specific Gravity of Road Oils, Road Tars, Asphalt Cements and Soft Tar Pitches. XX, Part I, 764 (1920).

Toughness of Rock. XVII, Part I, 773 (1917).

"Tests of Concrete Road Aggregates." J. P. Nash. XVII, Part II, 394 (1917). Discussion, 417.

"The Sampling of Deposits of Road Stone and Gravel in the Field." L. Reinecke and K. A. Clark. XVIII, Part II, 393 (1918). Discussion, 414.

ROAD MATERIALS (*Continued*).

"The So-Called Asphalt Content of Road Oils." B. A. Anderton and D. G. Taylor. XX, Part II, 314 (1920). Discussion, 320.

"The Standard Deval Abrasion Test for Rock." F. H. Jackson. XX, Part II, 278 (1920). Discussion, 291.

ROAD MATERIALS, REPORTS OF COMMITTEE.

Reports of the Committee on Road Materials:

Submitting proposed standard definitions of terms for road materials; Minority Report. XIII, 448 (1913). Discussion, 454.

Submitting proposed: test for apparent specific gravity of rock; test for absorption of water per cubic foot of rock; method of mechanical analysis of broken stone or broken slag; method of mechanical analysis of mixtures of sand or other fine material with broken stone or broken slag; standard definitions of terms applicable to materials relating to roads and pavements. XIV, Part I, 374 (1914).

Recommending for adoption definitions of terms applicable to materials relating to roads and pavements. Transmitting reports of: Special Joint Committee Appointed to Consider Definitions of Road Materials; Special Joint Committee Appointed to Consider Provisional Tests of Road Materials; Sub-committees on: Softening Point; Penetration; Ductility Tests. XV, Part I, 325 (1915). Discussion, 356.

Recommending for adoption as standard tests for: penetration of bituminous materials; loss on heating of oil and asphaltic compounds; method for making a mechanical analysis of broken stone or broken slag, except for aggregates used in cement concrete; method for making a mechanical analysis of sand or other fine highway material, except for aggregates used in cement concrete; method for making a mechanical analysis of mixtures of sand or other fine material with broken stone or broken slag, except for aggregates used in cement concrete; method for distillation of bituminous materials suitable for road treatment. Submitting as tentative tests for: determination of apparent specific gravity of homogeneous coarse aggregates; form of specifications for certain commercial grades of broken stone; method for determination of softening point of bituminous materials other than tar products. Submitting revision in the Standard Definitions of Terms Applicable to Materials Relating to Roads and Pavements. Submitting report of sub-committee on Penetration of Bituminous Materials. XVI, Part I, 300 (1916). Discussion, 316.

Submitting revisions of: Standard Method for Distillation of Bituminous Materials Suitable for Road Treatment; Definitions of Terms Relating to Materials for Roads and Pavements. Submitting as tentative tests for: toughness of rock; determination of apparent specific gravity of coarse aggregates. Transmitting reports on British Standard Nomenclature of Bituminous Materials. XVII, Part I, 470 (1917).

Recommending for adoption as standard tests for determination of apparent specific gravity of coarse aggregates; form of specifications for certain commercial grades of broken stone; definitions of terms relating to materials for roads and pavements; tests for toughness of rock. Submitting revisions of: Standard Method for Distillation of Bituminous Materials Suitable for Road Treatment; Method for Making a Mechanical Analysis of Sand or Other Fine Highway Material Except for Fine Aggregates Used in Cement-Concrete. Submitting as tentative tests for determination of apparent specific gravity of sand, stone and slag screenings and other fine non-bituminous highway materials. XVIII, Part I, 326 (1918).

Recommending for adoption as standard tests for determination of apparent specific gravity of sand, stone and slag screenings and other fine non-bituminous materials; method for determination of softening point of bituminous materials other than tar products. Submitting as tentative: test for loss on heating of oil and asphaltic compounds; method

ROAD MATERIALS, REPORTS OF COMMITTEE (*Continued*).

Reports of the Committee on Road Materials (*Continued*):

for determination of softening point of tar products (cube-in-water method); specifications for: materials for cement grout filler for brick and stone block pavement; materials for cement mortar bed for brick, stone block and wood block pavement; block for granite block pavement. XIX, Part I, 392 (1919).

Submitting as tentative: tests for specific gravity of road oils, road tars, asphalt cements and soft tar pitches; specific gravity of asphalts and tar pitches sufficiently solid to be handled in fragments; quantity of clay and silt in gravel for highway construction; quantity of clay in sand-clay, topsoil, and semi-gravel for highway construction; quantity of clay and silt in sand for highway construction; methods for sampling stone, slag, gravel, sand and stone block for use as highway materials, including some material survey methods; specifications for: workability of concrete for concrete pavements; commercial sizes of broken stone and broken slag for highway construction; commercial sizes of sand and gravel for highway construction; broken slag for waterbound base; shovel-run or crusher-run broken slag for waterbound base; natural or artificial sand-clay mixtures for highway surfacing. Recommending for adoption as standard tests for loss on heating of oil and asphaltic compounds; method for determination of softening point of tar products; specifications for: materials for cement grout filler for brick and stone block pavements; materials for cement mortar bed for brick, stone block and wood block pavements. Transmitting report of Collaborative Tests of Sectional Committee on Penetration Relative to Modification of the Standard Needle. Transmitting paper on "Proportions and Quantities of Materials for Concrete for Highway Construction" by D. A. Abrams. XX, Part I, 428 (1920). Discussion, 441.

ROCK.

See **Aggregates** (page 20); **Road Materials** (page 76); **Stone** (page 92).

RUBBER PRODUCTS.

"An Autographic Friction Testing Machine for Testing Mechanical Rubber Goods." J. M. Bierer. XIV, Part II, 627 (1914). Discussion, 634.

"Construction of Steam Hose." J. M. Bierer. XX, Part II, 355 (1920). Discussion, 359.

Proposed Tentative Specifications for Insulated Wire and Cable: 30-per-cent Hevea Rubber. XV, Part I, 411 (1915).

Reports of the Committee on Rubber Products:

Progress report on organization of the committee. XIII, 466 (1913).

Progress report. XIV, Part I, 387 (1914). Discussion, 388.

Recommending for adoption specifications for: $2\frac{3}{4}$-in. cotton rubber-lined fire hose for private department use; methods for testing cotton rubber-lined hose. Submitting as tentative specifications for insulated wire and cable: 30-per-cent Hevea rubber. XV, Part I, 408 (1915). Discussion, 434.

Submitting as tentative specifications for $2\frac{1}{2}$, 3 and $3\frac{1}{2}$-in. double-jacketed cotton rubber-lined fire hose for public fire department use. XVI, Part I, 357 (1916).

Submitting as tentative specifications for air-line hose for pneumatic tools. XVII, Part I, 494 (1917).

Recommending for adoption as standard specifications for: $2\frac{1}{2}$, 3, and $3\frac{1}{2}$-in. double-jacketed cotton rubber-lined fire hose for public fire department use; air-line hose for pneumatic tools. Submitting as tentative specifications for: rubber belting for power transmission; steam hose. XVIII, Part I, 354 (1918). Addendum, 356.

RUBBER PRODUCTS (*Continued*).

Reports of the Committee on Rubber Products (*Continued*):

Submitting as tentative specifications for leader hose for use with pneumatic tools. Submitting revisions of the: Tentative Specifications for Rubber Belting for Power Transmission; Standard Specifications for $2\frac{5}{8}$-in. Cotton Rubber-Lined Fire Hose for Private Department Use; for $2\frac{1}{2}$, 3 and $3\frac{1}{2}$-in. Double-Jacketed Cotton Rubber-Lined Fire Hose for Public Fire Department Use. XIX, Part I, 396 (1919).

Submitting as tentative specifications for adhesive insulating tape. Recommending for adoption as standard specifications for: leader hose for use with pneumatic tools; steam hose; rubber belting for power transmission. XX, Part I, 453 (1920).

"Rubber Belting and Methods of Testing." W. E. Campbell. XIV, Part II, 617 (1914). Discussion, 624.

"Steam Hose." H. J. Force. XIX, Part II, 687 (1919).

Tentative Revisions of Standard Specifications for:

$2\frac{5}{8}$-in. Cotton Rubber-Lined Fire Hose for Private Department Use. XIX, Part I, 778 (1919); XX, Part I, 819 (1920).

$2\frac{1}{2}$, 3 and $3\frac{1}{2}$-in. Double-Jacketed Cotton Rubber-Lined Fire Hose for Public Fire Department Use. XIX, Part I, 779 (1919); XX, Part I, 819 (1920).

Tentative Specifications for:

$2\frac{1}{2}$, 3, and $3\frac{1}{2}$-in. Double-Jacketed Cotton Rubber-Lined Fire Hose for Public Fire Department Use. XVI, Part I, 487 (1916); XVII, Part I, 732 (1917).

Adhesive Insulating Tape. XX, Part I, 761 (1920).

Air-Line Hose for Pneumatic Tools. XVII, Part I, 763 (1917).

Insulated Wire and Cable: 30-per-cent Hevea Rubber. XVI, Part I, 492 (1916); XVII, Part I, 737 (1917); XVIII, Part I, 650 (1918); XIX, Part I, 689 (1919); XX, Part I, 736 (1920).

Leader Hose for Use With Pneumatic Tools. XIX, Part I, 724 (1919).

Rubber Belting for Power Transmission. XVIII, Part I, 676 (1918); XIX, Part I, 715 (1919).

Steam Hose. XVIII, Part I, 681 (1918); XIX, Part I, 720 (1919).

Tinned Soft or Annealed Copper Wire for Rubber Insulation. XIX, Part I, 503 (1919); XX, Part I, 574 (1920).

S

SAMPLING.

(Methods of sampling are indexed under the subjects covered by them.)

SAND.

See also **Aggregates** (page 20); **Road Materials** (page 76).

Abrams-Harder Field Test for Organic Impurities in Sand. XIX, Part I, 321 (1919).

"A Laboratory Method of Determining Pressures on Walls and Bins." J. Hammond Smith. XV, Part II, 382 (1915). Discussion, 395.

Discussion on proportioning of concrete. XIX, Part II, 476 (1919).

"Distribution of Pressures Through Earth Fills." A. T. Goldbeck. XVII, Part II, 640 (1917). Discussion, 655.

"Economical Proportions for Portland-Cement Mortars and Concretes." J. A. Kitts. XVII, Part II, 279 (1917). Discussion, 295.

"Effect of Tannic Acid on the Strength of Concrete." D. A. Abrams. XX, Part I, 309 (1920).

"Effects of Grading of Sands and Consistency of Mix upon the Strength of Plain and Reinforced Concrete." L. N. Edwards. XVII, Part II, 301 (1917). Discussion, 358. XVIII, Part II, 303 (1918).

SAND (*Continued*).

"Observations on the Testing of Sand." W. B. Reinke. XIII, 797 (1913). Discussion, 807.

"Proportioning the Materials of Mortars and Concretes by Surface Areas of Aggregates." L. N. Edwards. XVIII, Part II, 235 (1918). Discussion, 284.

Proposed Provisional Method for Making a Mechanical Analysis of Mixtures of Sand or Other Fine Material with Broken Stone or Broken Slag. XIV, Part I, 382 (1914).

Sand and slag cements. XX, Part II, 199 (1920).

Sand specifications. XVII, Part II, 353 (1917).

Suggested Colorimetric Tests for Organic Impurities in Sand. XVII, Part I, 327 (1917).

Tentative Methods for Sampling of Stone, Slag, Gravel, Sand and Stone Block for Use as Highway Materials, Including Some Material Survey Methods. XX, Part I, 789 (1920).

Tentative Specifications for:

Commercial Sizes of Sand and Gravel for Highway Construction. XX, Part I, 696 (1920).

Natural or Artificial Sand-Clay Mixtures for Highway Surfacing. XX, Part I, 702 (1920).

Tentative Tests for:

Determination of Apparent Specific Gravity of Sand, Stone and Slag Screenings, and Other Fine Non-Bituminous Highway Materials. XVIII, Part I, 689 (1918).

Quantity of Clay and Silt in Sand for Highway Construction. XX, Part I, 774 (1920).

Quantity of Clay in Sand-Clay, Topsoil and Semi-Gravel for Highway Construction. XX, Part I, 772 (1920).

"The Volume-Moisture Relation in Sand and a Method of Determining Surface Area Based Thereon." R. B. Young and W. D. Walcott. XX, Part II, 137 (1920).

SAND-LIME BRICK.

See also **Brick** (page 31).

Results of tests on building brick reported by university laboratories. XV, Part I, 152, 160 (1915).

SCLEROSCOPE HARDNESS.

See **Hardness** (page 53).

SCREW SPIKES.

See also **Track Spikes** (page 103).

Tentative Revisions of Standard Specifications for Steel Screw Spikes. XX, Part I, 810 (1920).

Tentative Specifications for Steel Screw Spikes. XVI, Part I, 412 (1916); XVII, Part I, 539 (1917).

SCREW STOCK.

Tentative Specifications for:

Cold-Drawn Steel: Bessemer Automatic Screw Stock. XIII, 191 (1913).

Cold-Drawn Steel: Open-Hearth Automatic Screw Stock. XIII, 193 (1913); XIV, Part I, 174 (1914).

Free-Cutting Brass Rod for Use in Screw Machines. XVII, Part I, 606 (1917).

SEASON CRACKING.

See **Corrosion Cracking** (page 47).

SEWER PIPE.

See also **Drain Tile** (page 48).

"Failure of a 30-in. Tile Drain at Albert Lea, Minnesota." R. W. Crum. XVII, Part II, 453 (1917). Discussion, 464.

Glossary of Terms Relating to Sewer Pipe. XIV, Part I, 202 (1914).

Practical examinations and tests to secure proper materials and manufacture of pipe. XVI, Part I, 239 (1916).

Reports of the Committee on Clay and Cement Sewer Pipe:

Progress report. XIII, 302 (1913).

Submitting recommendations for the laying of sewer pipe. Transmitting Glossary of Terms Relating to Sewer Pipe. XIV, Part I, 195 (1914).

Recommending for adoption as standard definitions of terms relating to sewer pipe. Submitting as tentative recommended practice for laying sewer pipe. XV, Part I, 163 (1915).

Submitting as tentative recommended practice for the laying of sewer pipe. Transmitting Analytical Data for Sewer Pipe. XVI, Part I, 220 (1916).

Submitting as tentative specifications for: clay sewer pipe; cement-concrete sewer pipe; required safe crushing strengths of sewer pipe to carry loads from ditch filling; recommended practice for laying sewer pipe. XVII, Part I, 293 (1917).

Submitting revisions of the Tentative Specifications for: Clay Sewer Pipe; Cement-Concrete Sewer Pipe. XVIII, Part I, 274 (1918). Addendum, 280.

Recommending for adoption as standard recommended practice for laying sewer pipe. Submitting revisions of the Tentative Specifications for Cement-Concrete Sewer Pipe. XIX, Part I, 305 (1919). Addendum, 306.

Recommending for adoption as standard specifications for: clay sewer pipe; cement-concrete sewer pipe. XX, Part I, 263 (1920). Addendum, 266.

Tentative Recommended Practice for Laying Sewer Pipe. XVI, Part I, 472 (1916); XVII, Part I, 701 (1917); XVIII, Part I, 612 (1918).

Tentative Specifications for:

Cement-Concrete Sewer Pipe. XVII, Part I, 647 (1917); XVIII, Part I, 555 (1918); XIX, Part I, 556 (1919).

Clay Sewer Pipe. XVII, Part I, 634 (1917); XVIII, Part I, 542 (1918); XIX, Part I, 543 (1919).

Required Safe Crushing Strengths of Sewer Pipe to Carry Loads from Ditch Filling. XVII, Part I, 659 (1917); XVIII, Part I, 567 (1918); XIX, Part I, 569 (1919); XX, Part I, 603 (1920).

The demands made upon sewer pipe. XVI, Part I, 223 (1916).

SHEETS.

"Method of Sampling and Analysis of Tin, Terne and Lead-Coated Sheets." J. A. Aupperle. XIV, Part II, 162 (1914). Discussion, 169.

Tentative Specifications for:

Aluminum Sheet. XVIII, Part I, 494 (1918); XIX, Part I, 475 (1919); XX, Part I, 546 (1920).

Sheet High Brass. XX, Part I, 580 (1920).

SHELLAC.

Determination of rosin in shellac. XIV, Part I, 345 (1914).

Insoluble test for shellac. XIV, Part I, 348 (1914).

Tentative Tests for Shellac. XVI, Part I, 522 (1916).

SHIPPING CONTAINERS.

"Conservation and Shipping Containers." B. W. Dunn. XIII, 1072 (1913). Discussion, 1098.

Discussion on box testing. XVIII, Part I, 351 (1918).

Reports of the Committee on Shipping Containers:

Outlining the work of the committee. Describing methods of testing shipping containers. XVI, Part I, 349 (1916).

Submitting as tentative specifications for: canned foods boxes, nailed and lock-corner construction; canned foods boxes, wirebound construction. XVII, Part I, 493 (1917).

Progress report. XVIII, Part I, 350 (1918). Discussion, 351.

Progress report. XIX, Part I, 395 (1919).

Submitting as tentative specifications for wooden boxes, nailed and lock-corner construction for the shipment of canned foods; general specifications for wooden boxes, nailed and lock-corner construction. XX, Part I, 449 (1920).

Tentative Specifications for:

Canned Foods Boxes, Nailed and Lock-Corner Construction. XVII, Part I, 723 (1917); XVIII, Part I, 641 (1918); XIX, Part I, 680 (1919).

Canned Foods Boxes, Wirebound Construction. XVII, Part I, 730 (1917); XVIII, Part I, 648 (1918); XIX, Part I, 687 (1919); XX, Part I, 728 (1920).

Wooden Boxes, Nailed and Lock-Corner Construction. XX, Part I, 730 (1920).

Wooden Boxes, Nailed and Lock-Corner Construction, for the Shipment of Canned Foods. XX, Part I, 727 (1920).

"The Development of a Box-Testing Machine and Some Results of Tests." J. A. Newlin and T. R. C. Wilson. XVI, Part II, 320 (1916).

SHIPS.

See also **Steel, Reports of Committee** (page 89).

Standard Specifications for:

Rivet Steel for Ships. XIII, 148 (1913).

Structural Steel for Ships. XIII, 143 (1913).

Tentative Revisions of Standard Specifications for Rivet Steel for Ships. XX, Part I, 812 (1920).

SIEVES.

"Screen-Scale Sieves Made to a Fixed Ratio." G. A. Dishro. XIII, 1053 (1913).

SILICA.

Discussion on high-silica portland cement. XVII, Part II, 254 (1917).

"High-Silica Portland Cement." A. W. K. Billings. XVII, Part II, 239 (1917). Discussion, 254.

"Preventable Defects in Refractory Bricks." C. E. Nesbitt and M. I. Bell. XIX, Part II, 619 (1919). Discussion, 630.

"Silica Cement." R. J. Montgomery. XVIII, Part II, 350 (1918).

"Suggested Improvements in the Manufacture of Silica Brick." C. E. Nesbitt and M. L. Bell. XVII, Part II, 467 (1917). Discussion, 483.

"Testing of Refractories." A. V. Bleininger. XIII, 967 (1913).

"The Necessity for Inspection and Testing of Refractory Brick." C. E. Nesbitt and M. L. Bell. XVIII, Part II, 336 (1918). Discussion, 346.

SILICON STEEL.

Effect of silicon upon magnetic properties. XVII, Part II, 17 (1917).

Tentative Specifications for Carbon Steel Bars for Railway Springs with Special Silicon Requirements. XVI, Part I, 418 (1916); XVII, Part I, 546 (1917).

SILICON STEEL (*Continued*).

Topical Discussion on the Rôle of the Several Alloying Elements in the Alloy Steels: "The Rôle of Silicon." W. E. Ruder. XVII, Part II, 15 (1917). Discussion, 45.

SLAG.

See also **Aggregates** (page 20); **Road Materials** (page 76).

"Blast-Furnace Slag as Aggregate in Concrete." W. A. Aiken. XIV, Part II, 280 (1914). Discussion, 288.

Determination of Apparent Specific Gravity of Sand, Stone and Slag Screenings, and Other Fine Non-Bituminous Highway Materials. XVIII, Part I, 689 (1918).

Proposed Provisional Method for:

Making a Mechanical Analysis of Broken Stone or Broken Slag. XIV, Part I, 381 (1914).

Making a Mechanical Analysis of Mixtures of Sand or Other Fine Material with Broken Stone or Broken Slag. XIV, Part I, 382 (1914).

Sand and slag cements. XX, Part II, 199 (1920).

"Slag Test for Refractory Brick Used in the Iron and Steel Industry. C. E. Nesbitt, and M. L. Bell. XVII, Part I, 314 (1917).

Tentative Methods for Sampling of Stone, Slag, Gravel, Sand and Stone Block for Use as Highway Materials, Including Some Material Survey Methods. XX, Part I, 789 (1920).

Tentative Specifications for:

Broken Slag for Waterbound Base. XX, Part I, 698 (1920).

Commercial Sizes of Broken Stone and Broken Slag for Highway Construction. XX, Part I, 693 (1920).

Shovel-Run or Crusher-Run Broken Slag for Waterbound Base. XX, Part I, 700 (1920).

Tentative Tests for Determination of Apparent Specific Gravity of Sand, Stone and Slag Screenings, and Other Fine Non-Bituminous Highway Materials. XVIII, Part I, 689 (1918).

"The Specific Gravity of Non-Homogeneous Aggregates." Prévost Hubbard and F. H. Jackson, Jr. XVI, Part II, 378 (1916). Discussion, 402.

SOFTENING POINT.

See also **Bituminous Materials** (page 29).

"Apparatus for Determination of Breaking Point of Pitches." H. E. Lloyd and P. P. Sharples. XIX, Part II, 782 (1919). Discussion, 790.

"Method for Studying the Effects of Temperature Upon the Physical Condition of Asphalts, Waxes, etc." J. A. Capp and F. A. Hull. XVII, Part II, 627 (1917). Discussion, 635.

"Methods for Determining the Melting Points of Asphalts." J. G. Miller and P. P. Sharpless. XIV, Part II, 502 (1914).

Proposed Test for Penetration of Bituminous Materials. XV, Part I, 352 (1915).

Report on penetration of bituminous materials. XV, Part I, 352 (1915); XVI, Part I, 306 (1916).

Report on softening point determination of bituminous materials. (Ring-and-Ball and Cube methods). XV, Part I, 341 (1915).

Tentative Methods for:

Determination of Softening Point of Bituminous Materials Other than Tar Products. XVI, Part I, 549 (1916); XVII, Part I, 811 (1917); XVIII, Part I, 707 (1918).

Determination of Softening Point of Tar Products (Cube-in-Water Method). XIX, Part I, 764 (1919).

Tentative Test for Determination of Softening Point of Fire-Clay Brick. XIX, Part I, 594 (1919).

SOIL PIPE.

See **Pipe** (page 69).

SOIL PRESSURES.

See **Pressures** (page 72).

SOLDER.

See also **Alloys** (page 22).

Tentative Specifications for Solder Metal. XIX, Part I, 498 (1919); XX, Part I, 569 (1920).

SOYA BEAN OIL.

Tests on soya bean oils. XIII, 350 (1913).

SPECIFICATIONS.

(Specifications of the American Society for Testing Materials, and revisions thereof, are indexed under the subjects covered by them.)

"A Critical Review of the Procedure Governing the Adoption of Standards." Edgar Marburg. XIV, Part II, 639 (1914). Discussion, 649.

Classification of standing committees and standards. XVII, Part I, 519 (1917).

Discussion on specifications for cement. XVII, Part I, 198 (1917).

"National Standard Specifications and Their Relation to Export Trade." William R. Webster. XVI, Part II, 476 (1916). Discussion, 488.

"Standardization." Address by the President, G. H. Clamer, at the Twenty-Second Annual Meeting. XIX, Part I, 80 (1919).

"The Application of Specifications." Address by the President, Robert W. Hunt, at the Sixteenth Annual Meeting. XIII, 32 (1913).

SPECIFIC GRAVITY.

"Apparent Specific Gravity of Non-Homogeneous Fine Aggregates." A. S. Rea. XVII, Part II, 256 (1917).

Methods for determination of specific gravity of fractions of creosote oil. XVI, Part I, 337 (1916).

Proposed Provisional Test for the Determination of the Apparent Specific Gravity of Rock. XIV, Part I, 378 (1914).

Report of Special Joint Committee Appointed to Consider Provisional Tests of Road Materials. XV, Part I, 338 (1915).

Report on specific gravity of paint thinners other than turpentine. XVI, Part I, 290 (1916).

Report on weight, voids, density, specific gravity and consistency of concrete and concrete aggregates. XX, Part I, 340 (1920).

"Some Physical Constants of American Malleable Cast Iron." H. A. Schwartz. XIX, Part II, 247 (1919). Discussion, 266.

"Standardization of Methods for the Determination of Density." H. W. Bearce. XIX, Part I, 412 (1919).

"Supplementary Report on Density and Thermal Expansion of Linseed Oil." H. W. Bearce and E. L. Peffer. XIV, Part I, 262 (1914).

"Supplementary Report on the Density and Thermal Expansion of Turpentines." H. W. Bearce. XIV, Part I, 333 (1914).

Tentative Tests for:

Determination of Apparent Specific Gravity of Coarse Aggregates. XVII, Part I, 776 (1917).

Determination of Apparent Specific Gravity of Homogeneous Coarse Aggregates. XVI, Part I, 529 (1916).

Determination of Apparent Specific Gravity of Sand, Stone and Slag Screenings, and Other Fine Non-Bituminous Highway Materials. XVIII, Part I, 689 (1918).

Lubricants. XVII, Part I, 767 (1917).

SPECIFIC GRAVITY (*Continued*).

Tentative Tests for (*Continued*):

Paint thinners other than turpentine. XVI, Part I, 518 (1916).

Specific Gravity of Asphalts and Tar Pitches Sufficiently Solid to be Handled in Fragments. XX, Part I, 767 (1920).

Specific Gravity of Road Oils, Road Tars, Asphalt Cements and Soft Tar Pitches. XX, Part I, 764 (1920).

"The Specific Gravity of Non-Homogeneous Aggregates." Prévost Hubbard and F. H. Jackson, Jr. XVI, Part II, 378 (1916). Discussion, 402.

SPELTER.

See **Zinc** (page 109).

SPLICE BARS.

Discussion on steel splice bars. XIII, 174 (1913).

Standard Specifications for:

Extra-High-Carbon Steel Splice Bars. XIII, 139 (1913).

High-Carbon Steel Splice Bars. XIII, 135 (1913).

Medium-Carbon Steel Splice Bars. XIII, 131 (1913).

Tentative Revisions of Standard Specifications for Quenched High-Carbon-Steel Splice Bars. XX, Part I, 809 (1920).

SPRINGS.

"Mechanical Tests of Heat-Treated Spring Steel." R. P. Devries. XIII, 550 (1913). Discussion, 561.

Tentative Specifications for:

Carbon-Steel Bars for Railway Springs with Special Silicon Requirements. XVI, Part I, 418 (1916); XVII, Part I, 546 (1917).

Elliptical Springs for Automobiles. XVI, Part I, 421 (1916); XVII, Part I, 549 (1917).

STANDING COMMITTEES, REPORTS OF COMMITTEE.

Classification of standing committees and standards. XVII, Part I, 519 (1917).

Report of the Committee on Regulations Governing the Form but not the Substance of Specifications. Presenting a report on Regulations Governing Technical Committees. XIII, 470 (1913); XIV, Part I, 456 (1914).

Report of the Committee on Technical Committees: Submitting Revisions of Regulations Governing Technical Committees. XV, Part I, 456 (1915).

Reports of the Committee on Standing Committees:

Submitting revisions of Regulations Governing Standing Committees. XVI, Part I, 393 (1916).

Submitting revisions of Regulations Governing Standing Committees. Transmitting Statement of Sub-Committee on Classification of Standing Committees and Standards. XVII, Part I, 512 (1917).

Submitting revisions of Regulations Governing Standing Committees. XVIII, Part I, 428 (1918).

Submitting proposal for expression of measurements in A.S.T.M. standards in both English and metric units. Creation of new committees. XX, Part I, 477 (1920).

STAYBOLTS.

"A New Vibratory Testing Machine and Results Obtained by Its Use." S. V. Hunnings. XIV, Part II, 548 (1914).

Tentative Revisions of Standard Specifications for:

Copper Bars for Locomotive Staybolts. XX, Part I, 816 (1920).

Staybolt Iron. XX, Part I, 813 (1920).

Tentative Specifications for:

Copper Bars for Locomotive Staybolts. XVI, Part I, 441 (1916); XVII, Part I, 592 (1917).

Staybolt Iron. XVII, Part I, 564 (1917).

STEAM HOSE.

See **Hose** (page 55).

STEEL.

See also **Key Words** under **Steel** (page 15).

"A Failed Axle: Study of an Internal Transverse Fissure." Robert Job. XIV, Part II, 76 (1914). Discussion, 84.

An Apparatus for Delicate Flexure Tests and Some Results of Such Tests. W. J. Francke. XX, Part II, 372 (1920). Discussion, 387.

"A New Vibratory Testing Machine and Results Obtained by Its Use." S. V. Hunnings. XIV, Part II, 548 (1914).

"A Note on Stresses Caused by Cold Rolling." H. M. Howe and E. C. Groesbeck. XX, Part II, 31 (1920). Discussion, 38.

"Are the Effects of Simple Overstrain Monotropic?" H. M. Howe. XIV, Part II, 7 (1914). Discussion, 36.

"Condensed Report of the Investigation of Reinforcing Bars Rerolled from Steel Rails." W. K. Hatt. XIII, 96 (1913).

Discussion on phosphorus and sulfur in steel. XVIII, Part I, 136 (1918).

Discussion on specifications for carbon tool steel. XVII, Part I, 124 (1917).

"Effect of Size of Section on Physical Properties Developed by Heat Treatment." J. H. Nead. XIII, 489 (1913). Discussion, 525.

"Influence of Mass in the Heat Treatment of Steel." K. W. Zimmerschied. XIII, 510 (1913). Discussion, 525.

"Ladle Test Ingot Investigation." Report by J. R. Cain and H. S. Rawdon. XIX, Part I, 154 (1919).

"Mechanical Tests of Heat-Treated Spring Steel." R. P. Devries. XIII, 550 (1913). Discussion, 561.

"Method for Testing the Durability of Pipe under Corrosion." F. N. Speller. XVI, Part II, 343 (1916).

Methods of physical tests of steel, covering position of fracture. XIV, Part I, 98 (1914).

"Modern High Speed Steel." J. A. Mathews. XIX, Part II, 141 (1919). Discussion, 157.

"Notes on the Property of Toughness of Metals." A. F. Shore. XIII, 612 (1913).

"Oxygen in Iron and Steel: Value of Existing Methods for Its Determination." W. R. Fleming. XIII, 477 (1913). Discussion, 487.

Permissible variations in weight and gage of sheared plates. XIV, Part I, 100 (1914).

Preliminary Program of Tests Adopted by the Joint Committee on the Investigation of Phosphorus and Sulfur in Steel. XX, Part I, 139 (1920).

Proposed Recommended Practice for the Heat Treatment of Case-Hardened Carbon Steel Objects. XIII, 188 (1913).

"Rapid Semi-Autographic Tests for Determining the Proportional Limit." H. F. Moore. XVII, Part II, 589 (1917). Discussion, 596.

"Recrystallization as a Factor in the Failure of Boiler Tubes." A. E. White and H. F. Wood. XVI, Part II, 80 (1916). Discussion, 111.

Relation between yield point and tensile strength of steel. XIV, Part I, 100 (1914).

Report on Cooperative Analysis of a Low-Sulfur Tool Steel. XVI, Part I, 123 (1916).

"Report on Investigation of Ladle-Test Steel Ingots." J. R. Cain and H. S. Rawdon. XVI, Part I, 129 (1916).

Report on preparation of iron and steel surfaces for painting. XVI, Part I, 293 (1916); XVII, Part I, 451 (1917); XVIII, Part I, 310 (1918); XIX, Part I, 374 (1919).

STEEL (*Continued*).

Report on Procedure for Standardizing Arsenite Solutions for Manganese Determinations by the A.S.T.M. Standard Method. XVI, Part I, 126 (1916).

Report on specifications for plates for forge welding. XIX, Part I, 150 (1919).

"Resistance of Steels to Wear in Relation to Their Hardness and Tensile Properties." G. L. Norris. XIII, 562 (1913). Discussion, 568.

"Results of Tests of Welded Boiler Tubes." E. L. Lasier. XIII, 606 (1913).

Segregation as shown by sulfur prints. XVI, Part I, 133 (1916).

"Some Applications of Magnetic Analysis to the Study of Steel Products." C. W. Burrows. XVII, Part II, 87 (1917). Discussion, 105.

"Tension Tests of Steel with Test Specimens of Various Size and Form." H. F. Moore. XVIII, Part I, 403 (1918).

Tentative Revisions of Standard Tests for Magnetic Properties of Iron and Steel. XVI, Part I, 580 (1916).

"The Influence of Very Low Percentages of Copper in Retarding the Corrosion of Steel." D. M. Buck. XIX, Part II, 224 (1919). Discussion, 238.

"The Relation Between Yield Point and Proportional Limit in Various Grades of Steel." J. E. Howard. XVI, Part II, 403 (1916). Discussion, 434.

"The Relation Between Yield Point and Proportional Limit in Various Grades of Steel." T. D. Lynch. XVI, Part II, 413 (1916). Discussion, 434.

"The Relation Between Yield Point and Proportional Limit in Various Grades of Steel." H. F. Moore and F. B. Seely. XVI, Part II, 426 (1916). Discussion, 434.

"The Single Blow Notched Bar Impact Test as Used in the American Industry." E. H. Dix, Jr. XIX, Part II, 720 (1919). Discussion, 756.

Values of Percentages of Elongation and Reduction of Area Based on Inverse Ratio of the Tensile Strength. XIV, Part I, 118 (1914).

STEEL, COLD-DRAWN.

"Are the Effects of Simple Overstrain Monotropic?" H. M. Howe. XIV, Part II, 7 (1914). Discussion, 36.

Reports of the Committee on Standard Specifications for Cold-Drawn Steel:

Submitting tentative specifications for: cold-drawn steel: Bessemer automatic screw stock; cold-drawn steel: open-hearth automatic screw stock. XIII, 190 (1913). Discussion, 195.

Recommending for adoption specifications for: cold-drawn steel: Bessemer automatic screw stock. Submitting as tentative specifications for: cold-drawn steel: open-hearth automatic screw stock. XIV, Part I, 172 (1914).

Recommending for adoption specifications for cold-drawn steel: open-hearth automatic screw stock. XV, Part I, 132 (1915).

Tentative Specifications for:

Cold-Drawn Steel: Bessemer Automatic Screw Stock. XIII, 191 (1913).

Cold-Drawn Steel: Open-Hearth Automatic Screw Stock. XIII, 193 (1913); XIV, Part I, 174 (1914).

STEEL, CORROSION OF.

See **Corrosion** (page 46).

STEEL, HEAT TREATMENT OF.

See **Heat Treatment** (page 54).

STEEL, MAGNETIC TESTING OF.

See **Magnetic Testing** (page 61).

STEEL RAILS.

See **Rails** (page 72).

STEEL, REPORTS OF COMMITTEE.

Reports of the Committee on Steel:

Submitting revisions of Standard Specifications for: Steel Splice Bars; Structural Steel for Bridges; Structural Nickel Steel; Structural Steel for Buildings; Steel Reinforcing Bars; Steel Axles; Steel Tires; Steel Castings; Lap-Welded and Seamless Steel Boiler Tubes and Safe-ends, 2½ in. in Diameter and Under; Automobile Carbon and Alloy Steels; Boiler and Firebox Steel; Boiler Rivet Steel; Annealed Steel Forgings; Steel Shapes, Universal Mill Plates and Bars. Recommending for adoption specifications for: medium-carbon-steel splice bars; high-carbon-steel splice bars; extra-high-carbon-steel splice bars; structural steel for ships; rivet steel for ships; rail-steel concrete reinforcement bars; cold-rolled steel axles; wrought, solid carbon-steel wheels for electric railway service; blooms, billets and slabs for carbon-steel forgings. Submitting reports on Reinforcing Bars, Rerolled from Steel Rails; Wrought Steel Wheels. XIII, 58 (1913). Discussion, 169.

Submitting revisions of Standard Specifications for: Bessemer Steel Rails; Open-Hearth Steel Rails; Low-Carbon-Steel Splice Bars; Medium-Carbon-Steel Splice Bars; High-Carbon-Steel Splice Bars; Extra-High-Carbon-Steel Splice Bars; Structural Steel for Bridges; Structural Nickel Steel; Structural Steel for Buildings; Shapes, Universal Mill Plates and Bars for Locomotive Materials; Billet Steel Concrete Reinforcement Bars; Steel Forgings; Heat-Treated Carbon-Steel Axles, Shafts and Similar Objects; Steel Forgings for Locomotives; Carbon-Steel Car and Tender Axles; Cold-rolled Steel Axles. Recommending for adoption specifications for: structural steel for cars; carbon steel bars and springs; methods of chemical analysis for plain carbon steel. Submitting revisions of the requirement for retesting tension test specimens which break outside the gage length. Presenting Regulations Governing Committee A-1. Submitting reports on: Values of Percentages of Elongation and Reduction of Area Based on Inverse Ratio of the Tensile Strength; Proof Tests of Finished Forgings; Permissible Variations in Weight and Gage of Sheared Plates. Minority report. XIV, Part I, 80 (1914). Discussion, 131.

Submitting revisions of Standard Specifications for: Structural Steel for Bridges; Automobile Carbon and Alloy Steels. Recommending for adoption specifications for: lap-welded and seamless boiler tubes for stationary service; welded steel and wrought-iron pipe; heat-treated high-carbon-steel splice bars; heat-treated carbon-steel track bolts; heat-treated alloy steel tracks bolts; method for chemical analysis of alloy steels. Submitting as tentative specifications for: carbon-steel bars for vehicle and automobile springs; silica-manganese-steel bars for automobile and railway springs; chrome-vanadium-steel bars for automobile and railway springs; helical and elliptical springs for railways; alloy-steel forgings; quenched-and-tempered alloy-steel axles, shafts and other forgings for locomotives and cars. Submitting report on Finishing Temperatures of Rails. XV, Part I, 79 (1915). Discussion, 115.

Submitting revisions in Standard Specifications for: Structural Steel for Bridges; Structural Nickel Steel; Structural Steel for Buildings; Structural Steel for Locomotives; Structural Steel for Cars; Structural Steel for Ships; Carbon-Steel Bars for Railway Springs; Carbon-Steel and Alloy-Steel Forgings; Quenched-and-Tempered Carbon-Steel Axles, Shafts and Other Forgings for Locomotives and Cars; Carbon-Steel Forgings for Locomotives; Cold-Rolled Steel Axles; Steel Castings; Lap-Welded and Seamless Steel Boiler Tubes, Safe Ends and Arch Tubes; Boiler and Firebox Steel; Wrought Solid Carbon-Steel Wheels for Steam Railway Service; Wrought Solid Carbon-Steel Wheels for Electric Railway Serivce; Steel Tires. Recommending for adoption specifications for: carbon-steel bars for vehicle

STEEL, REPORTS OF COMMITTEE (*Continued*).

Reports of the Committee on Steel (*Continued*):

and automobile springs; silico-manganese-steel bars for automobile and railway springs; chrome-vanadium-steel bars for automobile and railway springs; helical springs for railways; elliptical springs for railways; alloy-steel forgings; quenched-and-tempered alloy-steel axles, shafts and other forgings for locomotives and cars; quenched carbon-steel track bolts; quenched alloy-steel track bolts; automobile carbon and alloy steels. Submitting as tentative specifications for: steel track spikes; steel screw spikes; steel tie plates; carbon-steel bars for railway springs with special silicon requirements; elliptical springs for automobiles; boiler and firebox steel for stationary service. Transmitting reports on: Cooperative Analysis of a Low-Sulfur Tool Steel; Procedure for Standardizing Arsenite Solutions for Manganese Determinations by the A.S.T.M. Standard Method; Transmitting paper on "Investigation of Ladle-Test Steel Ingots" by J. R. Cain and H. S. Rawdon. XVI, Part I, 86 (1916). Addendum, 145.

Submitting revisions of the Standard Specifications for: Blooms, Billets and Slabs for Carbon-Steel Forgings; Carbon-Steel and Alloy-Steel Forgings; Quenched-and-Tempered Carbon-Steel Axles, Shafts, etc.; Quenched-and-Tempered Alloy-Steel Axles, Shafts, etc.; Lap-Welded and Seamless Steel Boiler Tubes, etc., for Locomotives; Lap-Welded and Seamless Steel and Wrought-Iron Boiler Tubes for Stationary Service: Welded Steel and Wrought-Iron Pipe; Automobile Carbon and Alloy Steels; Boiler and Firebox Steel for Locomotives. Submitting as tentative specifications for: steel tie plates; boiler and firebox steel for stationary service; carbon tool steel. Transmitting reports on: "The Rail Situation"; "Calculation of Energy Expended in Bending a Beam." XVII, Part I, 86 (1917). Addendum, 118. Discussion, 121.

Submitting revisions of the Standard Specifications for: Carbon-Steel and Alloy-Steel Forgings; Carbon-Steel Car and Tender Axles; Welded Steel and Wrought-Iron Pipe; Boiler and Firebox Steel for Locomotives; Quenched-and-Tempered Carbon-Steel Axles, etc.; Quenched-and-Tempered Alloy-Steel Axles, etc.; Lap-Welded and Seamless Steel Boiler Tubes, etc., for Locomotives; Lap-Welded and Seamless Steel and Wrought-Iron Boiler Tubes for Stationary Service; Automobile Carbon and Alloy Steels; Blooms, Billets and Slabs for Carbon-Steel Forgings; Structural Steel for Cars; Steel Tires. Recommending for adoption as standard specifications for: steel track spikes; steel screw spikes; carbon-steel bars for railway springs with special silicon requirements; elliptical springs for automobiles. Submitting revisions of the Tentative Specifications for Steel Tie Plates. Submitting as tentative specifications for: low-carbon-steel track bolts; electric cast steel anchor chain. Transmitting report on The Rail Situation. XVIII, Part I, 100 (1918). Addendum, 128. Discussion, 136.

Submitting revisions of the Standard Specifications for: Open-Hearth Steel Girder and High Tee Rails; Automobile Carbon and Alloy Steels. Submitting revisions of the Tentative Specifications for Low-Carbon-Steel Track Bolts. Submitting as tentative specifications for steel plates for forge welding. Recommending the removal of the phosphorus and sulfur note in certain steel specifications. Transmitting reports of sub-committees on: Specifications for Plates for Forge Welding; Ladle-Test Ingot Investigation. XIX, Part I, 138 (1919). Addendum, 171.

Submitting revisions of the Standard Specifications for: Quenched High-Carbon-Steel Splice Bars; Quenched Carbon-Steel Track Bolts; Quenched Alloy-Steel Track Bolts; Steel Screw Spikes; Structural Steel for Locomotives; Structural Steel for Cars; Structural Steel for Bridges; Structural Nickel Steel; Structural Steel for Buildings; Rivet Steel for Ships; Boiler Rivet Steel; Lap-Welded and Seam-

STEEL, REPORTS OF COMMITTEE (*Continued*).

Reports of the Committee on Steel (*Continued*):

less Boiler Tubes for Locomotives; Welded Steel Pipe; Automobile Carbon and Alloy Steels. Submitting revisions of the Tentative Specifications for: Steel Tie Plates; Low-Carbon-Steel Track Bolts; Steel Plates for Forge Welding; Carbon Tool Steel; Electric Cast Steel Anchor Chain. Submitting as tentative specifications for commercial bar steels. Outlining the organization of the Joint Committee on the Investigation of Phosphorus and Sulfur in Steel. Transmitting a report on Preliminary Program of Tests Adopted by the Joint Committee on the Investigation of Phosphorus and Sulfur in Steel. XX, Part I, 113 (1920).

STEEL, SPECIFICATIONS FOR.

Standard Specifications for:

Blooms, Billets and Slabs for Carbon-Steel Forgings. XIII, 166 (1913).

Cold-Rolled Steel Axles. XIII, 156 (1913).

Extra-High-Carbon Steel Splice Bars. XIII, 139 (1913).

High-Carbon Steel Splice Bars. XIII, 135 (1913).

Medium-Carbon Steel Splice Bars. XIII, 131 (1913).

Rail-Steel Concrete Reinforcement Bars. XIII, 153 (1913).

Rivet Steel for Ships. XIII, 148 (1913).

Structural Steel for Ships. XIII, 143 (1913).

Wrought Solid Carbon-Steel Wheels for Electric Railway Service. XIII, 160 (1913).

Tentative Revisions of Standard Specifications for:

Automobile Carbon and Alloy Steels. XX, Part I, 812 (1920).

Boiler Rivet Steel. XX, Part I, 812 (1920).

Lap-Welded and Seamless Steel Boiler Tubes for Locomotives. XX, Part I, 812 (1920).

Open-Hearth Steel Girder and High Tee Rails. XIX, Part I, 777 (1919); XX, Part I, 809 (1920).

Quenched Alloy-Steel Track Bolts. XX, Part I, 810 (1920).

Quenched Carbon-Steel Track Bolts. XX, Part I, 810 (1920).

Quenched High-Carbon-Steel Splice Bars. XX, Part I, 809 (1920).

Rivet Steel for Ships. XX, Part I, 812 (1920).

Steel Screw Spikes. XX, Part I, 810 (1920).

Structural Nickel Steel. XX, Part I, 811 (1920).

Structural Steel for Bridges. XX, Part I, 811 (1920).

Structural Steel for Buildings. XX, Part I, 811 (1920).

Structural Steel for Cars. XX, Part I, 811 (1920).

Structural Steel for Locomotives. XX, Part I, 811 (1920).

Welded Steel Pipe. XX, Part I, 812 (1920).

Tentative Specifications for:

Boiler and Firebox Steel for Stationary Service. XVI, Part I, 429 (1916); XVII, Part I, 557 (1917); XVIII, Part I, 449 (1918); XIX, Part I, 433 (1919); XX, Part I, 497 (1920).

Carbon-Steel Bars for Railway Springs with Special Silicon Requirements. XVI, Part I, 418 (1916); XVII, Part I, 546 (1917).

Carbon Tool Steel. XVII, Part I, 562 (1917); XVIII, Part I, 454 (1918); XIX, Part I, 438 (1919); XX, Part I, 502 (1920).

Cold-Drawn Steel: Bessemer Automatic Screw Stock. XIII, 191 (1913).

Cold-Drawn Steel: Open-Hearth Automatic Screw Stock. XIII, 193 (1913); XIV, Part I, 174 (1914).

STEEL, SPECIFICATIONS FOR (*Continued*).

Tentative Specifications for (*Continued*):

Electric Cast Steel Anchor Chain. XVIII, Part I, 460 (1918); XIX, Part I, 444 (1919); XX, Part I, 508 (1920).

Elliptical Springs for Automobiles. XIV, Part I, 421 (1916); XVII, Part I, 549 (1917).

Low-Carbon-Steel Track Bolts. XVIII, Part I, 456 (1918); XIX, Part I, 440 (1919); XX, Part I, 504 (1920).

Steel Plates for Forge Welding. XIX, Part I, 448 (1919); XX, Part I, 512 (1920).

Steel Screw Spikes. XVI, Part I, 412 (1916); XVII, Part I, 539 (1917).

Steel Tie Plates. XVI, Part I, 414 (1916); XVII, Part I, 541 (1917); XVIII, Part I, 445 (1918); XIX, Part I, 429 (1919); XX, Part I, 493 (1920).

Steel Track Spikes. XVI, Part I, 410 (1916); XVII, Part I, 537 (1917).

Welded Steel Pipe. XX, Part I, 487 (1920).

STEEL, TOOL.

See **Tool Steel** (page 102).

STEELS, ALLOY.

See **Alloy Steels** (page 21).

STONE.

See also **Aggregates** (page 20); **Road Materials** (page 76).

"A Laboratory Method of Determining Pressures on Walls and Bins." J. Hammond Smith. XV, Part II, 382 (1915). Discussion, 395.

"An Abrasion Test for Stone, Gravel and Similar Aggregates." H. H. Scofield. XVIII, Part II, 416 (1918). Discussion, 426.

"Effect of Controllable Variables on the Toughness Test for Rock." F. H. Jackson, Jr. XVII, Part II, 571 (1917). Discussion, 586.

Proposed Provisional Method for:

Making a Mechanical Analysis of Broken Stone or Broken Slag. XIV, Part I, 381 (1914).

Making a Mechanical Analysis of Mixtures of Sand or Other Fine Material with Broken Stone or Broken Slag. XIV, Part I, 382 (1914).

"Relation Between the Tests of Wearing Properties of Road-Building Rocks." L. W. Page. XIII, 983 (1913). Discussion, 993.

Tentative Methods for:

Form of Specifications for Certain Commercial Grades of Broken Stone. XVI, Part I, 548 (1916); XVII, Part I, 810 (1917).

Sampling of Stone, Slag, Gravel, Sand and Stone Block for Use as Highway Materials, Including Some Material Survey Methods. XX, Part I, 789 (1920).

Tentative Specifications for:

Block for Granite Block Pavements. XIX, Part I, 654 (1919); XX, Part I, 690 (1920).

Commercial Sizes of Broken Stone and Broken Slag for Highway Construction. XX, Part I, 693 (1920).

Materials for Cement Grout Filler for Brick and Stone Block Pavement. XIX, Part I, 650 (1919).

Materials for Cement Mortar Bed for Brick, Stone Block and Wood Block Pavement. XIX, Part I, 652 (1919).

Tentative Tests for Determination of Apparent Specific Gravity of Sand, Stone and Slag Screenings, and Other Fine Non-Bituminous Highway Materials. XVIII, Part I, 689 (1918); XIX, Part I, 689 (1919).

"The Sampling of Deposits of Road Stone and Gravel in the Field." L. Reinecke and K. A. Clark. XVIII, Part II, 393 (1918). Discussion, 414.

STONE (*Continued*).

"The Standard Deval Abrasion Test for Rock." F. H. Jackson. XX, Part II, 278 (1920). Discussion, 291.

STRAINOMETER.

"An Improved Type of Axial Strainometer." A. C. Alvarez. XIV, Part II, 520 (1914). Discussion, 531.

"A Universal Strainometer of Simple Design." S. H. Graf. XV, Part II, 376 (1915).

Recommendations relating to extensometers. XIV, Part I, 400 (1914).

"Use of the Strain Gage in the Testing of Materials." W. A. Slater and H. F. Moore. XIII, 1019 (1913). Discussion, 1039.

"Wire Testing Extensometer." T. D. Lynch and P. H. Brace. XIX, Part II, 695 (1919). Discussion, 707.

SULFUR.

Discussion on phosphorus and sulfur in steel XVIII, Part I, 136 (1918).

Preliminary Program of Tests Adopted by the Joint Committee on Investigation of Phosphorus and Sulfur in Steel. XX, Part I, 139 (1920).

Report on cooperative analysis of a low-sulfur tool steel. XVI, Part I, 123 (1916).

Report on sulfur determination in lubricants. XX, Part I, 407 (1920).

Segregation as shown by sulfur prints. XVI, Part I, 133 (1916).

Sulfur in coal. XIV, Part I, 423 (1914).

T

TANKS.

Report on specifications for plates for forge welding. XIX, Part I, 150 (1919).

Tentative Specifications for Steel Plates for Forge Welding. XIX, Part I, 448 (1919); XX, Part I, 512 (1920).

TANNIC ACID.

Abrams-Harder Field Test for Organic Impurities in Sands. XIX, Part I, 321 (1919).

"Effect of Tannic Acid on the Strength of Concrete." D. A. Abrams. XX, Part I, 309 (1920).

Suggested Colorimetric Tests for Organic Impurities in Sand. XVII, Part I, 327 (1917).

TAPE.

See **Rubber Products** (page 79); **Textile Materials** (page 99).

TAR.

See **Bituminous Materials** (page 29).

TENSION TESTING.

"A New Type of Automatic Cement Tester." T. Y. Olsen. XX, Part II, 408 (1920).

"Comparison of Strip and Grab Methods of Testing Textile Fabric for Tensile Strength." W. S. Lewis. XVI, Part I, 366 (1916).

"Comparison of Strip and Grab Methods of Testing Textile Fabric for Tensile Strength." E. D. Walen. XVI, Part I, 370 (1916).

"Condensed Report of the Investigation of Reinforcing Bars Rerolled from Steel Rails." W. K. Hatt. XIII, 96 (1913).

"Determination of Tensile Strength of Duck by the Strip Method." E. D. Walen. XVI, Part I, 379 (1916).

Discussion on testing of textile materials. XVI, Part I, 386 (1916).

"Effect of Fineness of Cement." D. A. Abrams. XIX, Part II, 328 (1919). Discussion, 409.

TENSION TESTING (*Continued*).

"Effect of Jaws on Fabric Strength." J. H. Dunlap, A. E. Jury and W. O. Jelleme. XX, Part I, 469 (1920).

Effect of machine capacity on apparent strength of textiles. XIX, Part I, 401 (1919).

"Effect of Machining and of Cross-Section on the Tensile Properties of Malleable Cast Iron." H. A. Schwartz. XX, Part II, 70 (1920).

"Effect of Moisture on the Tensile Strength of Aircraft Fabrics." G. B. Haven. XVIII, Part I, 380 (1918).

Effect of moisture on tensile strength of fabrics. XVIII, Part I, 360 (1918).

Effect of moisture upon gummed cloth tape. XIX, Part I, 404 (1919).

"Effect of Size of Section on Physical Properties Developed by Heat Treatment." J. H. Nead. XIII, 489 (1913). Discussion, 525.

"Effect of Unbroken Warp Threads on Tensile Strength of Textile Fabric." John Lind. XVI, Part I, 383 (1916).

"Endurance and Impact Tests of Metals." D. J. McAdam, Jr. XVI, Part II, 292 (1916). Discussion, 307.

"Hardness of Hard-Drawn Copper." E. H. Pierce. XVII, Part II, 114 (1917). Discussion, 122.

"Machine Rate-of-Load as Affecting Breaking Strength Shown by Fabric Testing Machines." W. O. Jelleme. XX, Part I, 460 (1920).

Methods of physical tests of steel. XIV, Part I, 98 (1914).

"Resistance of Steels to Wear in Relation to Their Hardness and Tensile Properties." G. L. Norris. XIII, 562 (1913). Discussion, 568.

"Some Tests of Light Aluminum Casting Alloys: The Effect of Heat Treatment." P. D. Merica and C. P. Karr. XIX, Part II, 297 (1919).

"Strength of Cast Zinc or Spelter." Gilbert Rigg and G. M. Williams. XIII, 669 (1913). Discussion, 698.

"Strength of Lime Mortar." W. E. Emley and S. E. Young. XIV, Part II, 338 (1914).

Table of corrected tensile strengths of fabric and yarn at various moisture regains. XVIII, Part I, 368 (1918).

"Tension Tests of Steel with Test Specimens of Various Size and Form." H. F. Moore. XVIII, Part I, 403 (1918).

"Tests of Concrete Road Aggregates." J. P. Nash. XVII, Part II, 394 (1917). Discussion, 417.

"The Use of Turned Sections in Tension Tests of Reinforcing Bars." E. P. Withrow and L. C. Niedner. XIV, Part II, 90 (1914). Discussion, 107.

Values of Percentages of Elongation and Reduction of Area Based on Inverse Ratio of the Tensile Strength. XIV, Part I, 118 (1914).

"Variables Affecting the Indicated Breaking Strength of Cotton Fabrics." W. O. Jelleme. XX, Part I, 456 (1920).

Variation in strength of textiles of various moisture regains, with relation to the weight of the fabric. XIX, Part I, 404 (1919).

TERNE.

See **Lead** (page 58); **Tin** (page 102).

TESTING.

See **Key Words** under **Testing** (page 16); also **Compression Testing** (page 40); **Corrosion** (page 46); **Fatigue** (page 50); **Hardness** (page 53); **Impact Testing** (page 56); **Repeated Stress** (page 75); **Tension Testing** (page 93); **Torsion Testing** (page 102); **Transverse Testing** (page 103); **Wearing Properties** (page 106).

(Reports and papers on testing specific materials are indexed under the names of those materials.)

TESTING APPARATUS.

See also **Testing, Methods of** (page 96).

"A Cylinder Friction and Lubrication Testing Apparatus." A. E. Flowers. XV, Part II, 399 (1915). Discussion, 412.

"A High-Speed Alternating Torsion Testing Machine." D. J. McAdam, Jr. XX, Part II, 366 (1920). Discussion, 371.

"A Machine for Testing Clay Products." Mont Schuyler. XIV, Part II, 557 (1914).

"An Alternating Torsion Testing Machine." D. J. McAdam, Jr. XVII, Part II, 599 (1917).

"An Apparatus for Delicate Flexure Tests and Some Results of Such Tests." W. J. Francke. XX, Part II, 372 (1920). Discussion, 387.

"An Apparatus for Determining Soil Pressures." A. T. Goldbeck and E. B. Smith. XVI, Part II, 309 (1916).

"An Apparatus for Testing the Standard Cast-Iron Arbitration Bar." H. L. Morse. XVI, Part II, 282 (1916).

"An Autographic Friction Testing Machine for Testing Mechanical Rubber Goods." J. M. Bierer. XIV, Part II, 627 (1914). Discussion, 634.

"An Efficiency Testing Machine for Testing Drills, Taps and Dies." T. Y. Olsen. XIV, Part II, 541 (1914).

"A New Colorimeter for White Pigments and Some Results Obtained by Its Use." A. H. Pfund. XX, Part II, 440 (1920). Discussion, 449.

"A New Consistency Tester for Viscous Liquid Bituminous Materials." Prévost Hubbard and F. P. Pritchard. XVII, Part II, 603 (1917). Discussion, 621.

"A New Method for Calibrating Brinell Hardness Testing Machines." J. L. Jones and C. H. Marshall. XX, Part II, 392 (1920). Discussion, 396.

"A New Type of Automatic Cement Tester." T. Y. Olsen. XX, Part II, 408 (1920).

"A New Vibratory Testing Machine and Results Obtained by Its Use." S. V. Hunnings. XIV, Part II, 548 (1914).

"A Simple Compression Machine for Testing Structural Materials." W. O. Lichtner. XIV, Part II, 535 (1914).

"An Improved Type of Axial Strainometer." A. C. Alvarez. XIV, Part II, 520 (1914). Discussion, 531.

"An Instrument for Measuring the Hiding Power of Paints." R. L. Hallett. XX, Part II, 426 (1920). Discussion, 436.

"Apparatus for Determination of Breaking Point of Pitches." H. E. Lloyd and P. P. Sharples. XIX, Part II, 782 (1919). Discussion, 790.

"A Simple Type of Brinell Testing Machine for 500-kg. Load." A. V. de Forest. XVIII, Part II, 449 (1918). Discussion, 466.

"A Universal Strainometer of Simple Design." S. H. Graf. XV, Part II, 376 (1915).

"A Viscosimeter for Gasoline." W. H. Herschel. XIX, Part II, 676 (1919).

"Determination of Absolute Viscosity by the Saybolt Universal and Engler Viscosimeters." W. H. Herschel. XVII, Part II, 551 (1917). Discussion, 569.

"Distribution of Pressures through Earth Fills." A. T. Goldbeck. XVII, Part II, 640 (1917). Discussion, 655.

"Ductility Testing Machines." T. Y. Olsen. XX, Part II, 398 (1920). Discussion, 404.

"Effect of Jaws on Fabric Strength." J. H. Dunlap, A. E. Jury and W. O. Jelleme. XX, Part I, 469 (1920).

"Emulsification of Mineral Lubricating Oils: Apparatus and Test Method." P. H. Conradson. XVI, Part II, 273 (1916). Discussion, 280.

TESTING APPARATUS (*Continued*).

"Endurance and Impact Tests of Metals." D. J. McAdam, Jr. XVI, Part II, 292 (1916). Discussion, 307.

"Extractor for Bituminous Paving Mixtures." C. N. Forrest. XIII, 1069 (1913).

"Fatigue Testing Machine." F. M. Farmer. XIX, Part II, 709 (1919). Discussion, 717.

"Further Development of the Plastometer and Its Practical Application to Research and Routine Problems." Henry Green. XX, Part II, 451 (1920). Discussion, 483.

"Improved Elastic Limit Recorder." C. H. Marshall. XX, Part II, 361 (1920).

"Large-Capacity Testing Machines in United States and England." E. L. Lasier. XIII, 996 (1913).

"Machine Rate-of-Load as Affecting Breaking Strength Shown by Fabric Testing Machines." W. O. Jelleme. XX, Part I, 460 (1920).

"Method and Apparatus for Determining Consistency." C. M. Chapman. XIII, 1045 (1913). Discussion, 1052.

Recommendations relating to extensometers. XIV, Part I, 400 (1914).

"Report on a Permeability Test for Paints and Varnishes." A. M. Muckenfuss. XIV, Part II, 359 (1914). Discussion, 426.

Report on textile testing machines. XVIII, Part I, 379 (1918).

"Screen-Scale Sieves Made to a Fixed Ratio." G. A. Disbro. XIII, 1053 (1913).

"Some Experiments on the Plastic Elongation of Wire." A. V. de Forest. XVI, Part II, 455 (1916). Discussion, 465.

"Spherical Bearings." Mont Schuyler. XIII, 1004 (1913).

"Sumner Elastic-Limit Recorder." J. L. Jones and C. H. Marshall. XVIII, Part II, 478 (1918).

"The Development of a Box-Testing Machine and Some Results of Tests." J. A. Newlin and T. R. C. Wilson. XVI, Part II, 320 (1916).

"The New Physical and Chemical Laboratory of the Pennsylvania Railroad Company at Altoona." C. D. Young. XV, Part II, 348 (1915).

"The Single Blow Notched Bar Impact Test as Used in the American Industry." E. H. Dix, Jr. XIX, Part II, 720 (1919). Discussion, 756.

"The Standard Saybolt Universal Viscosimeter." W. H. Herschel. XVIII, Part II, 363 (1918).

"Use of the Strain Gage in the Testing of Materials." W. A. Slater and H. F. Moore. XIII, 1019 (1913). Discussion, 1039.

"Viscosity Measurement and a New Viscosimeter." A. E. Flowers. XIV, Part II, 565 (1914).

"Wire Testing Extensometer." T. D. Lynch and P. H. Brace. XIX, Part II, 695 (1919). Discussion, 707.

TESTING LABORATORIES.

See **Laboratories** (page 58).

TESTING MACHINES.

See **Testing Apparatus** (page 95).

TESTING, METHODS OF.

(Methods of Analyses, Sampling, Testing, etc., of the American Society for Testing Materials, and revisions thereof, are indexed under the subjects covered by them.)

See also note under **Testing** (page 94).

"A Laboratory Method for Determining Pressures on Walls and Bins." J. Hammond Smith. XV, Part II, 382 (1915). Discussion, 395.

"An Apparatus for Delicate Flexure Tests and Some Results of Such Tests." W. J. Francke. XX, Part II, 372 (1920). Discussion, 387.

TESTING, METHODS OF (*Continued*).

"An Efficiency Testing Machine for Testing Drills, Taps and Dies." XIV, Part II, 541 (1914).

"A New Method of Obtaining Brinell Hardness." J. G. Ayers, Jr. XVIII, Part II, 460 (1918). Discussion, 466.

"A New Method of Testing Galvanized Coatings." A. S. Cushman. XX, Part II, 411 (1920). Discussion, 422.

A new method of testing zinc coatings. XIX, Part I, 179 (1919).

"An Improved Type of Axial Strainometer." A. C. Alvarez. XIV, Part II, 520 (1914). Discussion, 531.

"A Rational Test for Metallic Protective Coatings." J. A. Capp. XIV, Part II, 475 (1914). Discussion, 479.

"A Universal Strainometer of Simple Design." S. H. Graf. XV, Part II, 376 (1915).

Calculation of Energy Expended in Bending a Beam. XVII, Part I, 115 (1917).

"Comparison of Strip and Grab Methods of Testing Textile Fabric for Tensile Strength." W. S. Lewis. XVI, Part I, 366 (1916).

"Comparison of Strip and Grab Methods of Testing Textile Fabric for Tensile Strength." E. D. Walen. XVI, Part I, 370 (1916).

"Constants and Diagrams for Repeated Stress Calculations." H. F. Moore and F. B. Seely. XVI, Part II, 470 (1916).

"Determination of Tensile Strength of Duck by the Strip Method." E. D. Walen. XVI, Part I, 379 (1916).

Determination of zinc coatings. XVII, Part I, 144 (1917).

Discussion on elastic limit. XV, Part II, 431 (1915).

"Effect of Jaws on Fabric Strength." J. H. Dunlap, A. E. Jury and W. O. Jelleme. XX, Part I, 469 (1920).

Effect of machine capacity on apparent strength of textiles. XIX, Part I, 401 (1919).

"Effect of Moisture on the Tensile Strength of Aircraft Fabrics." G. B. Haven. XVIII, Part I, 380 (1918).

Effect of moisture on tensile strength of fabrics. XVIII, Part I, 360 (1918).

"Effect of Rate of Application of Load on the Compressive Strength of Concrete." D. A. Abrams. XVII, Part II, 364 (1917). Discussion, 375.

"Effect of Size of Section on Physical Properties Developed by Heat Treatment." J. H. Nead. XIII, 489 (1913). Discussion, 525.

"Elastic Limit." T. D. Lynch. XV, Part II, 415 (1915). Discussion, 431.

"Errors in the Methods of Determining the Time of Setting of Cement." G. M. Williams. XIV, Part II, 172 (1914). Discussion, 194.

General discussion on yield point and proportional limit. XVI, Part II, 434 (1916).

"Machine Rate-of-Load as Affecting Breaking Strength Shown by Fabric Testing Machines." W. O. Jelleme. XX, Part I, 460 (1920).

"Method and Apparatus for Determining Consistency." C. M. Chapman. XIII, 1045 (1913). Discussion, 1052.

"Method of Making the Salt-Spray Corrosion Test." A. N. Finn. XVIII, Part I, 237 (1918).

"Method of Sampling and Analysis of Tin, Terne and Lead-Coated Sheets." J. A. Aupperle. XIV, Part II, 162 (1914). Discussion, 169.

"Method of Studying the Action of Specimens of Textile Fabric During Tests." H. L. Scott. XVI, Part I, 363 (1916).

"Method for Testing the Durability of Pipe under Corrosion." F. N. Speller. XVI, Part II, 343 (1916).

"Modulus of Elasticity of Concrete." Stanton Walker. XIX, Part II, 510 (1919). Discussion, 586.

TESTING, METHODS OF (*Continued*).

"Observations on the Testing of Sand." W. B. Reinke. XIII, 797 (1913).

"Practical Methods for Testing Refractory Fire Brick." C. E. Nesbitt and M. L. Bell. XVI, Part II, 349 (1916). Discussion, 373.

"Rapid Semi-Autographic Tests for Determining the Proportional Limit." H. F. Moore. XVII, Part II, 589 (1917). Discussion, 596.

Recommendations relating to extensometers. XIV, Part I, 400 (1914).

"Relation Between Methods of Curing Standard Concrete Test Specimens and Their Compressive Strength at 28 Days." H. W. Green. XIX, Part II, 607 (1919).

Report on effect of form and size of test piece. XVII, Part I, 502 (1917).

Report on Proof Tests of Finished Forgings. XIV, Part I, 120 (1914).

Reports of the Committee on Standard Methods of Testing:

Progress report. XIII, 469 (1913).

Proposing revisions of the Standard Methods of Testing. XIV, Part I, 391 (1914). Discussion, 397.

Progress report. XV, Part I, 443 (1915). Discussion, 449.

Submitting revisions of the Standard Methods of Testing. XVI, Part I, 390 (1916).

Submitting revisions of the Standard Methods of Testing. Transmitting report of sub-committee on Effect of Form and Size of Test Piece. XVII, Part I, 499 (1917).

Submitting revisions of the Standard Methods of Testing. Transmitting paper on "Tension Tests of Steel with Test Specimens of Various Size and Form," by H. F. Moore. XVIII, Part I, 399 (1918).

Transmitting paper on "Standardization of Methods for Determination of Density," by H. W. Bearce. XIX, Part I, 411 (1919).

"Rubber Belting and Methods of Testing." W. E. Campbell. XIV, Part II, 617 (1914). Discussion, 624.

"Some Determinations of the Stress-Deformation Relations for Concretes under Repeated and Continuous Loadings." G. M. Williams. XX, Part II, 233 (1920). Discussion, 250.

"Some Tests of Light Aluminum Casting Alloys: The Effect of Heat Treatment." P. D. Merica and C. P. Karr. XIX, Part II, 297 (1919).

"Study of Bearing Metals and Methods of Testing." T. D. Lynch. XIII, 699 (1913). Discussion, 712.

"Study of the Strength of Non-Ferrous Castings: Comparison of Different Test Specimens." L. P. Webbert. XIV, Part II, 145 (1914). Discussion, 159.

"Sumner Elastic-Limit Recorder." J. L. Jones and C. H. Marshall. XVIII, Part II, 478 (1918).

Table of corrected tensile strengths of fabric and yarn at various moisture regains. XVIII, Part I, 368 (1918).

"Tension Tests of Steel with Test Specimens of Various Size and Form." H. F. Moore. XVIII, Part I, 403 (1918).

Tentative Definitions and Rules Governing the Preparation of Micrographs of Metals and Alloys. XVII, Part I, 838 (1917); XVIII, Part I, 716 (1918); XIX, Part I, 768 (1919).

"The Relation Between Yield Point and Proportional Limit in Various Grades of Steel." J. E. Howard. XVI, Part II, 403 (1916). Discussion, 434.

"The Relation Between Yield Point and Proportional Limit in Various Grades of Steel." T. D. Lynch. XVI, Part II, 413 (1916). Discussion, 434.

"The Relation Between Yield Point and Proportional Limit in Various Grades of Steel." H. F. Moore and F. B. Seely. XVI, Part II, 426 (1916). Discussion, 434.

TESTING, METHODS OF (*Continued*).

"The Single Blow Notched Bar Impact Test as Used in the American Industry." E. H. Dix, Jr. XIX, Part II, 720 (1919). Discussion, 756.

"The Specific Gravity of Non-Homogeneous Aggregates." Prévost Hubbard and F. H. Jackson, Jr. XVI, Part II, 378 (1916). Discussion, 402.

"The Use of Turned Sections in Tension Tests of Reinforcing Bars." E. P. Withrow and L. C. Niedner. XIV, Part II, 90 (1914). Discussion, 107.

"The Variable-Pressure Method for the Measurement of Viscosity." E. C. Bingham. XVIII, Part II, 373 (1918). Discussion, 384.

"Transverse Testing under Non-Uniformly Distributed Load with Special Application to Airplane Wing Ribs." I. H. Cowdrey. XVIII, Part II, 429 (1918).

"Use of the Strain Gage in the Testing of Materials." W. A. Slater and H. F. Moore. XIII, 1019 (1913). Discussion, 1039.

Values of Percentages of Elongation and Reduction of Area Based on Inverse Ratio of the Tensile Strength. XIV, Part I, 118 (1914).

"Variables Affecting the Indicated Breaking Strength of Cotton Fabrics." W. O. Jelleme. XX, Part I, 456 (1920).

Variation in strength of textiles at various moisture regains, with relation to the weight of the fabric. XIX, Part I, 404 (1919).

"Vital Factors in the Testing of Fire-Clay Refractories and in the Interpretation of Results." R. M. Howe. XX, Part I, 278 (1920).

"Wire Testing Extensometer." T. D. Lynch and P. H. Brace. XIX, Part II, 695 (1919). Discussion, 707.

Yield point of concrete. XIX, Part II, 581 (1919).

TEXTILE MATERIALS.

"Comparison of Strip and Grab Methods of Testing Textile Fabric for Tensile Strength." W. S. Lewis. XVI, Part I, 366 (1916).

"Comparison of Strip and Grab Methods of Testing Textile Fabric for Tensile Strength." E. D. Walen. XVI, Part I, 370 (1916).

"Determination of Tensile Strength of Duck by the Strip Method." E. D. Walen. XVI, Part I, 379 (1916).

Discussion on testing of textile materials. XVI, Part I, 386 (1916).

"Effect of Jaws on Fabric Strength." J. H. Dunlap, A. E. Jury, and W. O. Jelleme. XX, Part I, 469 (1920).

Effect of machine capacity on apparent strength of textiles. XIX, Part I, 401 (1919).

"Effect of Moisture on the Tensile Strength of Aircraft Fabrics." G. B. Haven. XVIII, Part I, 380 (1918).

Effect of moisture on tensile strength of fabric. XVIII, Part I, 360 (1918).

Effect of moisture upon gummed cloth tape. XIX, Part I, 404 (1919).

"Effect of Unbroken Warp Threads on Tensile Strength of Textile Fabric." John Lind. XVI, Part I, 383 (1916).

"Identification of Manila Fiber." C. E. Swett. XVIII, Part I, 377 (1918).

"Machine Rate-of-Load as Affecting Breaking Strength Shown by Fabric Testing Machines." W. O. Jelleme. XX, Part I, 460 (1920).

"Method of Studying the Action of Specimens of Textile Fabric During Tests." H. L. Scott. XVI, Part I, 363 (1916).

Report on textile testing machines. XVIII, Part I, 370 (1918).

Reports of the Committee on Textile Materials:

Submitting as tentative tests for automobile tire fabrics. XV, Part I, 440 (1915). Discussion, 442.

TEXTILE MATERIALS (*Continued*).

Reports of the Committee on Textile Materials (*Continued*):

Submitting as tentative method for testing of cotton fabrics; tests for automobile tire fabrics; tests for fabrics for use in hose, belting and similar articles; tests for cotton fabrics for use in bags and bagging material. Transmitting papers on "Method of Studying the Action of Specimens of Textile Fabric During Tests," by H. L. Scott; "Comparison of Strip and Grab Methods of Testing Textile Fabric for Tensile Strength," by E. D. Walen; "Comparison of Strip and Grab Methods of Testing Textile Fabric for Tensile Strength," by W. S. Lewis (with note contributed by W. D. Hartshorne); "Determination of Tensile Strength of Duck by the Strip Method," by E. D. Walen; "Effect of Unbroken Warp Threads on Tensile Strength of Textile Fabric," by John Lind. XVI, Part I, 360 (1916). Discussion, 386.

Progress report. XVII, Part I, 497 (1917).

Submitting as tentative general methods for testing cotton fabrics. Transmitting Regulations Governing Committee D-13 on Textile Materials; results on tensile strength of fabric at various moisture regains; report of sub-committee on Testing Machines. Transmitting papers on "Identification of Manila Fiber," by C. E. Swett; "Effect of Moisture on the Tensile Strength of Aircraft Fabrics," by G. B. Haven. XVIII, Part I, 357 (1918).

Submitting revisions of the Tentative General Methods for Testing Cotton Fabrics. XIX, Part I, 400 (1919).

Submitting as tentative methods for testing textiles. Recommending for adoption as standard general methods for testing cotton fabrics. Transmitting papers on "Variables Affecting the Indicated Breaking Strength of Cotton Fabrics," by W. O. Jelleme; "Machine Rate-of-Load as Affecting Breaking Strength Shown by Fabric Testing Machines," by W. O. Jelleme; "Effect of Jaws on Fabric Strength," by J. H. Dunlap, A. E. Jury, and W. O. Jelleme. XX, Part I, 455 (1920).

Table of corrected tensile strengths of fabric and yarn at various moisture regains. XVIII, Part I, 368 (1918).

Tentative Methods for:

Testing Cotton Fabrics. XVI, Part I, 572 (1916); XVII, Part I, 829 (1917); XVIII, Part I, 709 (1918); XIX, Part I, 749 (1919).

Testing Textiles. XX, Part I, 804 (1920).

Tentative Tests for:

Automobile Tire Fabrics. XVI, Part I, 531 (1916); XVII, Part I, 791 (1917).

Cotton Fabrics for Use in Bags and Bagging Material. XVI, Part I, 534 (1916); XVII, Part I, 794 (1917).

Cotton Fabrics for Use in Hose, Belting, and Similar Articles. XVI, Part I, 533 (1916); XVII, Part I, 793 (1917).

"Variables Affecting the Indicated Breaking Strength of Cotton Fabrics." W. O. Jelleme. XX, Part I, 456 (1920).

Variation in strength of textiles at various moisture regains, with relation to the weight of the fabric. XIX, Part I, 404 (1919).

THERMAL EXPANSION.

"Supplementary Report on the Density and Thermal Expansion of Linseed Oil." H. W. Bearce and E. L. Peffer. XIV, Part I, 262 (1914).

"Supplementary Report on the Density and Thermal Expansion of Turpentines." H. W. Bearce. XIV, Part I, 333 (1914).

THINNERS, PAINT.

See **Paints** (page 67).

TIE PLATES.

Tentative Specifications for Steel Tie Plates. XVI, Part I, 414 (1916); XVII, Part I, 541 (1917); XVIII, Part I, 445 (1918); XIX, Part I, 429 (1919); XX, Part I, 493 (1920).

TILE.

See **Building Tile** (page 33); **Drain Tile** (page 48).

TIMBER.

"A Fungus Bed Test of Wood Preservatives." C. M. Chapman. XV, Part II, 267 (1915).

"Discussion of Proposed Forest Service Rules for Grading the Strength of Southern Pine Structural Timbers." H. S. Betts. XV, Part I, 369 (1915).

Discussion on wooden paving blocks. XVIII, Part I, 340 (1918).

Reports of the Committee on Timber:

Progress Report. XIV, Part I, 385 (1914).

Submitting revisions of the Standard Classification of Structural Timber; Standard Specifications for Yellow-Pine Bridge and Trestle Timbers. Submitting as tentative specifications for: Southern yellow-pine timber to be creosoted. Southern yellow-pine piles and poles to be creosoted; methods for sampling and analysis of creosote oil. Transmitting papers on: "Discussion of Proposed Forest Service Rules for Grading the Strength of Southern Pine Structural Timbers," by H. S. Betts; and "Southern Yellow-Pine Timber and Density Grading Rules," by O. T. Swan. XV, Part I, 362 (1915). Discussion, 402.

Submitting as tentative specifications for: selected structural Douglas fir bridge and trestle timbers; methods for sampling and analysis of creosote oil. Submitting reports of sub-committees on: Pacific Coast Timbers; Timber Preservatives. Transmitting paper on "The Need of a Quality Classification for Douglas Fir," by J. A. Newlin. XVI, Part I, 327 (1916).

Recommending for adoption as standard methods for sampling and analysis of creosote oil. Submitting as tentative methods for analysis of creosote oil. XVII, Part I, 483 (1917).

Submitting as tentative specifications for wooden paving blocks. Recommending for adoption as standard methods for analysis of creosote oil. XVIII, Part I, 336 (1918). Discussion, 340.

Submitting as tentative specifications for structural Douglas fir bridge and trestle timbers. Recommending for adoption as standard specifications for: wooden paving blocks for exposed pavements; Southern yellow-pine timber to be creosoted; Southern yellow-pine piles and poles to be creosoted. XX, Part I, 446 (1920).

Report on water sampling in creosote oil. XVI, Part I, 328 (1916).

"Southern Yellow-Pine Timber and Density Grading Rules." O. T. Swan. XV, Part I, 385 (1915).

Tentative Specifications for:

Materials for Cement Mortar Bed for Brick, Stone Block and Wood Block Pavement. XIX, Part I, 652 (1919).

Selected Structural Douglas Fir Bridge and Trestle Timbers. XVI, Part I, 479 (1916); XVII, Part I, 704 (1917); XVIII, Part I, 617 (1918); XIX, Part I, 656 (1919).

Southern Yellow-Pine Piles and Poles to be Creosoted. XVI, Part I, 485 (1916); XVII, Part I, 710 (1917); XVIII, Part I, 623 (1918); XIX, Part I, 662 (1919).

Southern Yellow-Pine Timber to be Creosoted. XVI, Part I, 483 (1916); XVII, Part I, 708 (1917); XVIII, Part I, 621 (1918); XIX, Part I, 660 (1919).

Structural Douglas Fir. XX, Part I, 704 (1920).

Wooden Paving Blocks for Exposed Pavements. XVIII, Part I, 625 (1918); XIX, Part I, 664 (1919).

"The Need of a Quality Classification for Douglas Fir." J. A. Newlin. XVI, Part I, 340 (1916).

TIMBER (*Continued*).

"The Uses and Properties of Water-Resistant Plywood." Armin Elmendorf. XX, Part II, 324 (1920).

TIN.

See also **Alloys** (page 22).

"A Note on the Constitution of Certain Tin-Bearing Brasses." William Campbell. XX, Part II, 104 (1920).

A Review of the Tin Situation. XVI, Part I, 187 (1916).

Discussion on sand-cast alloys for steam service. XVI, Part I, 193 (1916).

"Electrolytic Determination of Tin on Tinned Copper Wire." G. G. Grower. XVII, Part II, 129 (1917). Discussion, 153.

"Lead-Tin-Antimony and Tin-Antimony-Copper Alloys." William Campbell. XIII, 630 (1913). Discussion, 666.

"Method of Sampling and Analysis of Tin, Terne and Lead-Coated Sheets." J. A. Aupperle. XIV, Part II, 162 (1914). Discussion, 169.

Properties of Manganese Bronze. XVII, Part I, 186 (1917).

Properties of the Alloy: Copper, 80 per cent; Tin, 10 per cent; Lead, 10 per cent. XVII, Part I, 188 (1917).

Properties of the Alloy: Copper, 88 per cent; Tin, 10 per cent; Zinc, 2 per cent. XVII, Part I, 182 (1917).

Results of tests on alloys. XIII, 211 (1913).

Tentative Methods for Chemical Analysis of Alloys of Lead, Tin, Antimony and Copper. XVII, Part I, 622 (1917); XVIII, Part I, 502 (1918); XIX, Part I, 509 (1919); XX, Part I, 589 (1920).

Tentative Specifications for:

Solder Metal. XIX, Part I, 498 (1919); XX, Part I, 569 (1920).

The Alloy: Copper, 88 per cent; Tin, 10 per cent; Zinc, 2 per cent. XVI, Part I, 434 (1916); XVII, Part I, 585 (1917).

White Metal Bearing Alloys (Known Commercially as "Babbitt Metal"). XVIII, Part I, 487 (1918); XIX, Part I, 468 (1919); XX, Part I, 538 (1920).

TOOL STEEL.

Discussion on specifications for carbon tool steel. XVII, Part I, 124 (1917).

"Modern High Speed Steel." J. A. Mathews. XIX, Part II, 141 (1919). Discussion, 157.

Report on cooperative analysis of low-sulfur tool steel. XVI, Part I, 123 (1916).

"Some Applications of Magnetic Analysis to the Study of Steel Products." C. W. Burrows. XVII, Part II, 87 (1917). Discussion, 105.

Tentative Specifications for Carbon Tool Steel. XVII, Part I, 562 (1917); XVIII, Part I, 454 (1918); XIX, Part I, 438 (1919); XX, Part I, 502 (1920).

Topical Discussion on Magnetic Analysis, "A Systematic Investigation of the Correlation of the Magnetic and Mechanical Properties of Steel." N. J. Gebert. XIX, Part II, 117 (1919). Discussion, 136.

TOOLS.

"An Efficiency Testing Machine for Testing Drills, Taps and Dies." T. Y. Olsen. XIV, Part II, 541 (1914).

Magnetic testing of tools. XIX, Part II, 40 (1919).

Topical Discussion on Magnetic Analysis: "Magnetic Analysis as a Criterion of the Quality of Steel and Steel Products." C. W. Burrows and F. P. Fahy. XIX, Part II, 5 (1919). Discussion, 136.

TORSION TESTING.

"A High-Speed Alternating Torsion Testing Machine." D. J. McAdam, Jr. XX, Part II, 366 (1920). Discussion, 371.

TORSION TESTING (*Continued*).

"An Alternating Torsion Testing Machine." D. J. McAdam, Jr. XVII, Part II, 599 (1917).

"Endurance and Impact Tests of Metals." D. J. McAdam, Jr. XVI, Part II, 292 (1916). Discussion, 307.

TOUGHNESS.

See also **Hardness** (page 53); **Impact Testing** (page 56); **Wearing Properties** (page 106).

"Effect of Controllable Variables on the Toughness Test for Rock." F. H. Jackson, Jr. XVII, Part II, 571 (1917). Discussion, 586.

"Notes on the Property of Toughness of Metals." A. F. Shore. XIII, 612 (1913).

Tentative Tests for Toughness of Rock. XVII, Part I, 773 (1917).

"The Sampling of Deposits of Road Stone and Gravel in the Field." L. Reinecke and K. A. Clark. XVIII, Part II, 393 (1918). Discussion, 414.

TRACK BOLTS.

Tentative Revisions of:

Standard Specifications for Quenched Alloy-Steel Track Bolts. XX, Part I, 810 (1920).

Standard Specifications for Quenched Carbon-Steel Track Bolts. XX, Part I, 810 (1920).

Tentative Specifications for Low-Carbon-Steel Track Bolts. XVIII, Part I, 456 (1918); XIX, Part I, 440 (1919); XX, Part I, 504 (1920).

TRACK SPIKES.

See also **Screw Spikes** (page 81).

Tentative Specifications for Steel Track Spikes. XVI, Part I, 410 (1916); XVII, Part I, 537 (1917).

TRANSVERSE FISSURES.

"A Failed Axle: Study of an Internal Transverse Fissure." Robert Job. XIV. Part II, 76 (1914). Discussion, 84.

"On the Shattered Zones in Certain Steel Rails, with Notes on the Interior Origin of Transverse Fissures." J. E. Howard. XX, Part II, 44 (1920) Discussion, 60.

Topical Discussion on Magnetic Analysis: "Magnetic Surveys on New and Failed Rails." P. H. Dudley. XIX, Part II, 51 (1919). Discussion, 136.

Transverse fissures in rails. XVI, Part I, 94 (1916).

TRANSVERSE TESTING.

"An Apparatus for Delicate Flexure Tests and Some Results of Such Tests." W. J. Francke. XX, Part II, 372 (1920). Discussion, 387.

Calculation of Energy Expended in Bending a Beam. XVII, Part I, 115 (1917).

"Mechanical Tests of Heat-Treated Spring Steel." R. P. Devries. XIII, 550 (1913). Discussion, 561.

"Relation Between Deformation and Deflection in Reinforced-Concrete Beams." G. A. Maney. XIV, Part II, 310 (1914).

Report on Design of Reinforced Gypsum Beams. XIX, Part I, 348 (1919).

"Strength of Cast Zinc or Spelter." Gilbert Rigg and G. M. Williams. XIII, 669 (1913). Discussion, 698.

"Strength of Lime Mortar." W. E. Emley and S. E. Young. XIV, Part II, 338 (1914).

"Tests of Concrete Slabs to Determine the Effect of Removing Excess Water Used in Mixing." A. N. Johnson. XVII, Part II, 378 (1917). Discussion, 385.

TRANSVERSE TESTING (*Continued*).

"Transverse Testing under Non-Uniformly Distributed Load with Special Application to Airplane Wing Ribs." I. H. Cowdrey. XVIII, Part II, 429 (1918).

TUBES.

"An Investigation Leading to Specifications for Brass Condenser Tubes." A. E. White. XVI, Part II, 151 (1916). Discussion, 168.

"Considerations Affecting Specifications for Wrought Non-Ferrous Materials." W. Reuben Webster. XIV, Part II, 127 (1914). Discussion, 141.

"Interior Surface Defects on Brass Condenser Tubes as a Cause of Corrosion." W. Reuben Webster. XVII, Part II, 204 (1917).

"Recrystallization as a Factor in the Failure of Boiler Tubes." A. E. White and H. F. Wood. XVI, Part II, 80 (1916). Discussion, 111.

"Results of Tests of Welded Boiler Tubes." E. L. Lasier. XIII, 606 (1913).

Tentative Revisions of Standard Specifications for Lap-Welded and Seamless Steel Boiler Tubes for Locomotives. XX, Part I, 812 (1920).

Tentative Specifications for:

Seamless Brass Boiler Tubes. XVI, Part I, 448 (1916); XVII, Part I, 599 (1917).

Seamless Copper Boiler Tubes. XVI, Part I, 444 (1916); XVII, Part I, 595 (1917).

Topical Discussion on Season and Corrosion Cracking of Brass: "Season Cracking and Splitting of Condenser Tubes and Pipes." William Campbell, XVIII, Part II, 147 (1918). Discussion, 201.

TUNG OIL.

"Examination of Chinese Wood Oil." E. E. Ware and C. L. Schumann. XIV, Part II, 454 (1914). Discussion, 464.

Examination of special tung oils. XIV, Part I, 256 (1914).

Tentative Revisions of Standard Specifications for Purity of Raw Tung Oil. XX, Part I, 819 (1920).

"Testing of Chinese Wood Oil." E. W. Boughton. XIII, 923 (1913). Discussion, 942.

Tests on Chinese wood oils. XIV, Part I, 237 (1914).

Tests on commercial Chinese wood oil and oil mixtures. XV, Part I, 204 (1915).

Tests on special American Chinese wood oils. XV, Part I, 211 (1915).

Tests on tung oils. XIII, 351 (1913); XX, Part I, 390 (1920).

TURPENTINE.

Examination of samples of turpentine preliminary to the preparation of specifications for turpentine. XIV, Part I, 316 (1914).

Flash-point tests of turpentine with tag closed tester. XIX, Part I, 372 (1919).

Proposed Specifications for Turpentine. XIV, Part I, 342 (1914).

Report on turpentine: consideration of proposed specifications on turpentine. XV, Part I, 263 (1915).

"Supplementary Report on Color of Turpentines." I. G. Priest. XIV, Part I, 340 (1914).

"Supplementary Report on the Density and Thermal Expansion of Turpentines." H. W. Bearce. XIV, Part I, 333 (1914).

"Supplementary Report on Refractive Indices of Turpentines." E. D. Tillyer. XIV, Part I, 338 (1914).

Tentative Revisions of Standard Specifications for Turpentine. XX, Part I, 818 (1920).

Tentative specifications for turpentine. XIII, 365 (1913); XX, Part I, 680 (1920).

V

VANADIUM STEEL.

"Effect of Size of Section on Physical Properties Developed by Heat Treatment." J. H. Nead. XIII, 489 (1913). Discussion, 525.

"Molybdenum as an Alloying Element in Structural Steels." G. W. Sargent. XX, Part II, 5 (1920). Discussion, 29.

"The Relation Between Maximum Strength, Brinell Hardness and Scleroscope Hardness in Treated and Untreated Alloy and Plain Steels." R. R. Abbott. XV, Part II, 42 (1915). Discussion, 60.

Topical Discussion on the Rôle of the Several Alloying Elements in the Alloy Steels:

"The Rôle of Chrome Vanadium." F. J. Griffiths. XVII, Part II, 33 (1917). Discussion, 55.

"The Rôle of Vanadium." G. L. Norris. XVII, Part II, 20 (1917). Discussion, 47.

VARNISH.

"Quantitative Determination of Body and Solvent in Varnish." A. L. Brown. XIV, Part II, 466 (1914).

"Report on a Permeability Test for Paints and Varnishes." A. M. Muckenfuss. XIV, Part II, 359 (1914). Discussion, 426.

Report on varnish:

Elasticity test and reports of analysts. XVIII, Part I, 305 (1918).

Tests for varnish. XVII, Part I, 386 (1917).

VEHICLES, PAINT.

See **Paints** (page 67).

VISCOSITY.

See also **Consistency** (page 44); **Penetration** (page 68); **Plastic Deformation** (page 69); **Softening Point** (page 84).

"A New Consistency Tester for Viscous Liquid Bituminous Materials." Prévost Hubbard and F. P. Pritchard. XVII, Part II, 603 (1917). Discussion, 621.

"A Viscosimeter for Gasoline." W. H. Herschel. XIX, Part II, 676 (1919).

Conversion tables for Saybolt Standard Universal, Engler and Redwood viscosimeters. C. W. Waidner. XV, Part I, 284 (1915).

Comparison of viscosity as determined by the Engler and Saybolt viscosimeters. XIV, Part I, 366 (1914).

"Determination of Absolute Viscosity by the Saybolt Universal and Engler Viscosimeters." W. H. Herschel. XVII, Part II, 551 (1917). Discussion, 569

Discussion on standard tests for lubricants. XIV, Part I, 368 (1914). XV, Part I, 295 (1915).

Discussion on viscosity. XVI, Part I, 316 (1916); XIX, Part I, 389 (1919).

Tentative Tests for Viscosity of Lubricants. XIX, Part I, 728 (1919).

"The Standard Saybolt Universal Viscosimeter." W. H. Herschel. XVIII, Part II, 363 (1918).

"The Variable-Pressure Method for the Measurement of Viscosity." E. C. Bingham. XVIII, Part II, 373 (1918). Discussion, 384.

"Viscosity Measurement and a New Viscosimeter." A. E. Flowers. XIV, Part II, 565 (1914).

VITRIFICATION.

See **Clay Products** (page 37).

W

WALLS.

See **Building Tile** (page 33); **Pressures** (page 72).

WATERPROOFING.

Addition of foreign substances to cement or during mixture for waterproofing. XIII, 461 (1913).

Causes of permeability of concrete. XIII, 460 (1913).

"Coal-Tar and Asphalt Products for Waterproofing." S. T. Wagner. XIII, 955 (1913). Discussion, 959.

External treatments for waterproofing concrete. XIII, 462 (1913).

"Paint Protection for Portland-Cement Surfaces." H. A. Gardner. XIV, Part II, 482 (1914). Discussion, 491.

Reports of the Committee on Waterproofing Materials:

Reporting results of its investigations on causes of permeability of concrete; addition of foreign substances to cement or during mixture; external treatments. XIII, 459 (1913).

Progress report outlining the organization of the committee. XV, Part I, 405 (1915).

Progress report. XVI, Part I, 347 (1916).

Submitting as tentative specifications for: asphalt for waterproofing; primer for use with asphalt for waterproofing; coal-tar pitch for waterproofing; creosote oil for priming coat with coal-tar pitch for waterproofing. XVII, Part I, 487 (1917).

Progress report. XVIII, Part I, 347 (1918).

"Report on a Permeability Test for Paints and Varnishes." A. M. Muckenfuss. XIV, Part II, 359 (1914). Discussion, 426.

Tentative Specifications for:

Asphalt for Use in Damp-proofing and Waterproofing. XVII, Part I, 712 (1917); XVIII, Part I, 630 (1918); XIX, Part I, 669 (1919); XX, Part I, 716 (1920).

Coal-Tar Pitch for Use in Damp-proofing and Waterproofing. XVII, Part I, 717 (1917); XVIII, Part I, 635 (1918); XIX, Part I, 674 (1919); XX, Part I, 721 (1920).

Creosote Oil for Priming Coat with Coal-Tar Pitch for Use in Damp-proofing and Waterproofing. XVII, Part I, 721 (1917); XVIII, Part I, 639 (1918); XIX, Part I, 678 (1919); XX, Part I, 725 (1920).

Primer for Use with Asphalt for Use in Damp-proofing and Waterproofing. XVII, Part I, 716 (1917); XVIII, Part I, 634 (1918); XIX, Part I, 673 (1919); XX, Part I, 720 (1920).

Waterproofing concrete. Discussion by A. H. Rhett. XVII, Part I, 264 (1917).

WAXES.

"Method for Studying the Effects of Temperature upon the Physical Condition of Asphalts, Waxes, etc." J. A. Capp and F. A. Hull. XVII, Part II, 627 (1917). Discussion, 635.

WEARING PROPERTIES.

See also **Hardness** (page 53); **Impact Testing** (page 56); **Toughness** (page 103).

"An Abrasion Test for Stone, Gravel and Similar Aggregates." H. H. Scofield. XVIII, Part II, 416 (1918). Discussion, 426.

"A Machine for Testing Clay Products." Mont Schuyler. XIV, Part II, 557 (1914).

"A Method of Making Wear Tests of Concrete." D. A. Abrams. XVI, Part II, 194 (1916). Discussion, 203.

Discussion on wearing properties. XVI, Part II, 203 (1916).

WEARING PROPERTIES (*Continued*).

"Impact Test on Concrete to Regulate Coarse and Fine Aggregate Qualities and Mixes for Highways." H. S. Mattimore. XX, Part II, 266 (1920). Discussion, 277.

"Practical Methods for Testing Refractory Fire Brick." C. E. Nesbitt and M. L. Bell. XVI, Part II, 349 (1916). Discussion, 373.

"Relation Between the Tests for the Wearing Qualities of Road-Building Rocks." L. W. Page. XIII, 983 (1913). Discussion, 993.

"Resistance of Steels to Wear in Relation to Their Hardness and Tensile Properties." G. L. Norris. XIII, 562 (1913). Discussion, 568.

"Tests of Concrete Road Aggregates." J. P. Nash. XVII, Part II, 394 (1917). Discussion, 417.

"The Sampling of Deposits of Road Stone and Gravel in the Field." L. Reinecke and K. A. Clark. XVIII, Part II, 393 (1918). Discussion, 414.

"The Standard Deval Abrasion Test for Rock." F. H. Jackson. XX, Part II, 278 (1920). Discussion, 291.

WEATHERING TESTS.

"Report on a Permeability Test for Paints and Varnishes." A. M. Muckenfuss. XIV, Part II, 359 (1914). Discussion, 426.

"Some Experiments on Technical Bitumens." S. R. Church and J. M. Weiss. XV, Part II, 274 (1915). Discussion, 294.

WELDING.

"Chain Cable and Some of Its Physical Properties." C. G. Lutts. XX, Part II, 80 (1920). Discussion, 102.

Report on specifications for plates for forge welding. XIX, Part I, 150 (1919).

"Results of Tests of Welded Boiler Tubes." E. L. Lasier. XIII, 606 (1913).

Tentative Revisions of Standard Specifications for:

Lap-Welded and Seamless Steel Boiler Tubes for Locomotives. XX, Part I, 812 (1920).

Welded Steel Pipe. XX, Part I, 812 (1920).

Welded Wrought-Iron Pipe. XX, Part I, 813 (1920).

Tentative Specifications for:

Steel Plates for Forge Welding. XIX, Part I, 448 (1919); XX, Part I, 512 (1920).

Welded Steel Pipe. XX, Part I, 487 (1920).

Wrought-Iron Pipe. XVII, Part I, 568 (1917).

WHEELS.

"Deep Etching of Rails and Forgings." F. M. Waring and K. E. Hofammann. XIX, Part II, 182 (1919). Discussion, 189.

Discussion on steel wheels. XIII, 176 (1913).

"Notes on Chilled Cast Iron." E. B. Tilt. XIV, Part II, 110 (1914). Discussion, 121.

Report on the Investigation of Wrought-Steel Wheels. XIII, 126 (1913).

Standard Specifications for Wrought Solid Carbon-Steel Wheels for Electric Railway Service. XIII, 160 (1913).

WIRE.

See also **Copper Wire** (page 46).

"Considerations Affecting Specifications for Wrought Non-Ferrous Materials." W. Reuben Webster. XIV, Part II, 127 (1914). Discussion, 141.

"Electrolytic Determination of Tin on Tinned Copper Wire." G. G. Grower. XVII, Part II, 129 (1917). Discussion, 153.

"Hardness of Hard-Drawn Copper." E. H. Peirce. XVII, Part II, 114 (1917). Discussion, 122.

WIRE (*Continued*).

Proposed Tentative Specifications for Insulated Wire and Cable: 30-per-cent Hevea Rubber. XV, Part I, 411 (1915).

"Some Experiments on the Plastic Elongation of Wire." A. V. de Forest. XVI, Part II, 455 (1916). Discussion, 465.

Tentative Specifications for:

Insulated Wire and Cable: 30-per-cent Hevea Rubber. XVI, Part I, 492 (1916); XVII, Part I, 737 (1917); XVIII, Part I, 650 (1918); XIX, Part I, 689 (1919); XX, Part I, 736 (1920).

Tinned Soft or Annealed Copper Wire for Rubber Insulation. XIX, Part I, 503 (1919); XX, Part I, 574 (1920).

"The Determination of Spelter Coating on Sheets and Wire." J. A. Aupperle. XV, Part II, 119 (1915). Discussion, 124.

"Wire-Testing Extensometer." T. D. Lynch and P. H. Brace. XIX, Part II, 695 (1919). Discussion, 707.

WOOD.

See **Timber** (page 101).

WROUGHT IRON.

"A New Vibratory Testing Machine and Results Obtained by Its Use." S. V. Hunnings. XIV, Part II, 548 (1914).

"Chain Cable and Some of Its Physical Properties." C. G. Lutts. XX, Part II, 80 (1920). Discussion, 102.

"Method of Testing the Durability of Pipe under Corrosion." F. N. Speller. XVI, Part II, 343 (1916).

Reports of the Committee on Wrought Iron:

Submitting Revisions of Standard Specifications for Engine-Bolt Iron; Refined Wrought-Iron Bars. Recommending for adoption as standard specifications for wrought-iron plates. XIII, 183 (1913).

Recommending for adoption revisions in the Standard Specifications for Staybolt Iron. XIV, Part I, 144 (1914).

Recommending for adoption specifications for: lap-welded and seamless boiler tubes for stationary service; welded steel and wrought-iron pipe. XV, Part I, 121 (1915).

Submitting revisions of Standard Specifications for Lap-Welded Iron Boiler Tubes. XVI, Part I, 147 (1916).

Submitting revisions of the Standard Specifications for Refined Wrought-Iron Bars. Submitting as tentative specifications for: wrought-iron pipe; staybolt iron; wrought-iron blooms and forgings. XVII, Part I, 130 (1917).

Submitting revisions of the Standard Specifications for: Lap-Welded Charcoal-Iron Boiler Tubes, Boiler Flues, Safe Ends, and Arch Tubes for Locomotives; Engine-Bolt Iron; Refined Wrought-Iron Bars; Wrought-Iron Plates; Iron and Steel Chain. Recommending for adoption as standard specifications for: staybolt iron; wrought-iron pipe; wrought-iron rolled or forged blooms and forgings for locomotives and cars. XVIII, Part I, 142 (1918). Addendum, 155.

Submitting revisions of the Standard Specifications for Engine-Bolt Iron. Submitting as tentative specifications for extra refined wrought-iron bars. XIX, Part I, 174 (1919).

Submitting revisions of the Standard Specifications for: Welded Wrought-Iron Pipe; Staybolt Iron. Submitting as tentative definitions of terms relating to wrought-iron specifications. XX, Part I, 143 (1920).

Standard Specifications for Wrought-Iron Plates. XIII, 185 (1913).

Tentative Definitions of Terms Relating to Wrought-Iron Specifications. XX, Part I, 526 (1920).

WROUGHT IRON (*Continued*).

Tentative Revisions of Standard Specifications for:

Engine-Bolt Iron. XIX, Part I, 778 (1919); XX, Part I, 813 (1920).

Staybolt Iron. XX, Part I, 813 (1920).

Welded Wrought-Iron Pipe. XX, Part I, 813 (1920).

Tentative Specifications for:

Extra Refined Wrought-Iron Bars. XIX, Part I, 454 (1919); XX, Part I, 522 (1920).

Staybolt Iron. XVII, Part I, 564 (1917).

Wrought-Iron Pipe. XVII, Part I, 568 (1917).

Wrought-Iron Rolled or Forged Blooms and Forgings for Locomotives and Cars. XVII, Part I, 573 (1917).

Tests on wrought-iron chain. XVIII, Part II, 105 (1918).

Y

YELLOW PINE.

See also **Timber** (page 101).

"Discussion of Proposed Forest Service Rules for Grading the Strength of Southern Pine Structural Timber." H. S. Betts. XV, Part I, 369 (1915).

"Southern Yellow-Pine Timber and Density Grading Rules." O. T. Swan. XV, Part I, 385 (1915).

Tentative Specifications for:

Southern Yellow-Pine Piles and Poles to be Creosoted. XVI, Part I, 485 (1916); XVII, Part I, 710 (1917); XVIII, Part I, 623 (1918); XIX, Part I, 662 (1919).

Southern Yellow-Pine Timber to be Creosoted. XVI, Part I, 483 (1916); XVII, Part I, 708 (1917); XVIII, Part I, 621 (1918); XIX, Part I, 660 (1919).

YIELD POINT.

See also **Elastic Limit** (page 49).

General discussion on yield point and proportional limit. XVI, Part II, 434 (1916).

"Inspection of Brass and Bronze." F. D. Flinn and Ernst Jonson. XVII, Part II, 212 (1917). Discussion, 224.

"Paint, a Plastic Material and not a Viscous Liquid; the Measurement of Its Mobility and Yield Value." E. C. Bingham and Henry Green. XIX, Part II, 640 (1919). Discussion, 665.

Reltion between yield point and tensile strength of steel. XIV, Part I, 100 (1914).

"The Relation Between Yield Point and Proportional Limit in Various Grades of Steel." J. E. Howard. XVI, Part II, 403 (1916). Discussion, 434.

"The Relation Between Yield Point and Proportional Limit in Various Grades of Steel." T. D. Lynch. XVI, Part II, 413 (1916). Discussion, 434.

"The Relation Between Yield Point and Proportional Limit in Various Grades of Steel." H. F. Moore and F. B. Seely. XVI, Part II, 426 (1916). Discussion, 434.

Yield point of concrete. XIX, Part II, 581 (1919).

Z

ZINC.

See also **Alloys** (page 22).

"A New Method of Testing Galvanized Coatings." A. S. Cushman. XX, Part II, 411 (1920). Discussion, 422.

A new method of testing zinc coatings. XIX, Part I, 179 (1919).

ZINC (*Continued*).

"A Note on the Constitution of Certain Tin-Bearing Brasses." William Campbell. XX, Part II, 104 (1920).

"Battery Zincs: Some Causes of Defective Service." Robert Job and F. F. White. XV, Part II, 112 (1915). Discussion, 116.

"Considerations Affecting Specifications for Wrought Non-Ferrous Materials." W. Reuben Webster. XIV, Part II, 127 (1914). Discussion, 141.

Determination of Manganese in Manganese Bronze. XVIII, Part I, 256 (1918).

Determination of zinc coatings. XVII, Part I, 144 (1917).

Discussion on sand-cast alloys for steam service. XVI, Part I, 193 (1916).

"Molten Zinc as a Reagent for the Macroscopic Etching of Iron and Steel." J. L. Jones. XV, Part II, 89 (1915). Discussion, 96.

Properties of Manganese Bronze. XVII, Part I, 186 (1917).

Properties of the Alloy: Copper, 88 per cent; Tin, 10 per cent; Zinc, 2 per cent. XVII, Part I, 182 (1917).

Spelter: Its Grades and Uses. XVI, Part I, 183 (1916)

"Strength of Cast Zinc or Spelter." Gilbert Rigg and G. M. Williams. XIII, 669 (1913). Discussion, 698.

"Structure of Commercial Zinc Coatings." H. S. Rawdon. XVIII, Part I, 216 (1918).

Tentative Revisions of Standard Specifications for Spelter. XVI, Part I, 583 (1916); XX, Part I, 816 (1920).

Tentative Specifications for:

Spelter. XVII, Part I, 615 (1917).

The Alloy: Copper, 88 per cent; Tin, 10 per cent; Zinc, 2 per cent. XVI, Part I, 434 (1916); XVII, Part I, 585 (1917).

"The Determination of Spelter Coating on Sheets and Wire." J. A. Aupperle. XV, Part II, 119 (1915). Discussion, 124.

"The Evaluation of Zinc Dust: A Proposed Method of Analysis." L. A. Wilson XVIII, Part II, 220 (1918).

AUTHOR INDEX.

A

ABBOTT, F. E.

Report of Committee A-1, Appendix I: Report of Sub-Committee II on Specifications for Plates for Forge Welding. (Chairman.) XIX, Part I, 150 (1919).

Specifications for steel tie plates. XVII, Part I, 122 (1917).

ABBOTT, R. R.

Alloy steels. XVII, Part II, 45, 47, 55 (1917).

Fatigue tests of steel. XIX, Part II, 219 (1919).

Heat treatment of steel. XV, Part II, 24 (1915).

Strength and hardness of steels. XV, Part II, 60 (1915).

"The Relation between Maximum Strength, Brinell Hardness and Scleroscope Hardness in Treated and Untreated Alloy and Plain Steels." XV, Part II, 42 (1915).

"Topical Discussion on the Rôle of the Several Alloying Elements in the Alloy Steels: The Rôle of Nickel." XVII, Part II, 9 (1917).

ABRAHAM, HERBERT.

Paint protection for portland-cement surfaces. XIV, Part II, 491 (1914).

ABRAMS, D. A.

"A Method of Making Wear Tests of Concrete." XVI, Part II, 194 (1916).

Compressive strength of concrete. XVII, Part II, 376, 377 (1917).

Concrete road aggregates. XVII, Part II, 418 (1917).

"Effect of Age on the Strength of Concrete." XVIII, Part II, 317 (1918).

"Effect of Fineness of Cement." XIX, Part II, 328 (1919).

"Effect of Hydrated Lime and Other Powdered Admixtures in Concrete." XX, Part II, 149 (1920).

"Effect of Rate of Application of Load on the Compressive Strength of Concrete." XVII, Part II, 364 (1917).

Effect of rodding concrete. XX, Part II, 231 (1920).

Excess water in concrete. XVII, Part II, 389 (1917).

Fineness of cement. XIX, Part II, 409, 417 (1919).

Modulus of elasticity of concrete. XX, Part II, 261 (1920).

Powdered admixtures in concrete. XX, Part II, 212 (1920).

Proportioning mortars. XVIII, Part II, 292 (1918).

Proportioning of concrete. XVII, Part II, 295 (1917).

Report of Committee C-9, Appendix I: "Outline of Compression Tests of Concrete for Investigation of Properties of Concrete Mixtures." XX, Part I, 294 (1920); Appendix II: "Effect of Tannic Acid on the Strength of Concrete." XX, Part I, 309 (1920).

Report of Committee D-4, Appendix II: "Proportions and Quantities of Materials for Concrete Highway Construction." XX, Part I, 437 (1920).

Splices in reinforcement bars. XVI, Part II, 233 (1916).

Strength of concrete. XVII, Part II, 358 (1917). XIX, Part II, 477, 501 (1919).

"Test of a 40-Foot Reinforced Concrete Highway Bridge." XIII, 884 (1913).

"Topical Discussion on Cooperation in Industrial Research: Cooperation of the Portland Cement Association and Lewis Institute in Experimental Studies of Concrete." XVIII, Part II, 56 (1918).

Wear tests of paving materials. XVI, Part II, 206 (1916).

ABRAMS, V. R.

Report of Committee D-2, Appendix: "Determination of Resistance of Lubricating Oils to Emulsification." XX, Part I, 416 (1920).

ACKER, E. O'C.

Alloy steels. XVII, Part II, 49 (1917).

Heat treatment of steel. XIII, 527 (1913).

ADDICKS, LAWRENCE.

Hardness of copper wire. XVII, Part II, 122 (1917).

AERTSEN, GUILLIAEM.

Deep etching of rails and forgings. XIX, Part II, 203 (1919).

Report of the Investigation of Wrought Steel Wheels, Conducted under the Direction of Sub-Committee VII, of Committee A-1, on Rolled Steel Wheels and Steel Tires. XIII, 126 (1913).

Specifications for boiler steel for locomotives. XVIII, Part I, 141 (1918).

Specifications for carbon tool steel. XVII, Part I, 127 (1917).

AIKEN, W. A.

"Blast-Furnace Slag as Aggregate in Concrete." XIV, Part II, 280 (1914).

Preservative coatings for structural materials. XIV, Part I, 354 (1914).

Report of Committee D-8 on Waterproofing. (Chairman.) XIII, 459 (1913); XV, Part I, 405 (1915); XVI, Part I, 347 (1916); XVII, Part I, 487 (1917).

Report of Special Sub-Committee, of Committee D-1, on Paints Used in Havre de Grace Bridge Tests. (Chairman.) XV, Part I, 190 (1915).

Report of Sub-Committee B, of Committee D-1, on Inspection of the Havre de Grace Bridge. (Chairman.) XIII, 332 (1913).

Report of Sub-Committee II, of Committee D-1, on Inspection of Havre de Grace Bridge. (Chairman.) XIV, Part I, 232 (1914); XV, Part I, 189 (1915).

Slag concrete. XIV, Part II, 297 (1914).

Standard specifications for brick. XIV, Part I, 193 (1914).

ALLEN, H. B.

Endurance and impact tests. XVI, Part II, 307 (1916).

ALVAREZ, A. C.

"An Improved Type of Axial Strainometer." XIV, Part II, 520 (1914).

Axial strainometers. XIV, Part II, 532 (1914).

ANDERTON, B. A.

Asphalt content of road oils. XX, Part II, 323 (1920).

Petroleum residuals. XX, Part II, 312, 313 (1920).

"Some Relations between the Characteristics of Steam-Distilled Petroleum Residuals." XX, Part II, 298 (1920).

"The So-Called Asphalt Content of Road Oils." XX, Part II, 314 (1920).

ARMSBY, S. P.

Report of Committee C-7 on Lime. (Acting Secretary.) XX, Part I, 271 (1920).

ASHTON, ERNEST.

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 271, 272 (1917).

Report of Committee C-1, Appendix: Report of Sub-Committee on Accelerated Tests of Cement. XV, Part I, 147 (1915).

Specifications for cement. XVI, Part I, 206, 210, 212 (1916).

ASTON, JAMES.

Testing galvanized coatings. XX, Part II, 423 (1920).

AUPPERLE, J. A.

"Method of Sampling and Analysis of Tin, Terne and Lead-Coated Sheets." XIV, Part II, 162 (1914).

Report of Committee A-5 on Corrosion of Iron and Steel. (Secretary.) XX, Part I, 145 (1920).

Spelter coating on sheets and wire. XV, Part II, 124, 125 (1915).

Testing galvanized coatings. XX, Part II, 422 (1920).

"The Determination of Spelter Coating on Sheets and Wire." XV, Part II, 119 (1915).

Tin, terne and lead-coated sheets. XIV, Part II, 170 (1914).

AYERS, J. G., JR.

"A New Method of Obtaining Brinell Hardness." XVIII, Part II, 460 (1918).

"Changes Within the Critical Range of a Given Steel: From Ac_1 to Ac_{3-2}." XVIII, Part II, 87 (1918).

"Micrographic Determination of Surface Decarburization in Heat-Treated Steels." XV, Part II, 80 (1915).

B

BACON, C. V.

Chinese wood oil. XIII, 944 (1913).

Standard tests for lubricants. XIV, Part I, 371 (1914).

BAILEY, E. G.

Coal. XIV, Part I, 453 (1914).

BANKS, R. M.

"Development of Brinell Hardness Tests on Thin Brass Sheet." XIX, Part II, 757 (1919).

BARBA, W. P.

Deep etching of rails and forgings. XIX, Part II, 197 (1919).

BARKER, PERRY.

Report of Sub-Committee VI, of the Joint Committee on Coal Analysis, on Sulfur. (Chairman.) XIV, Part I, 428 (1914).

BARNES, J. P.

Minority Report of Committee A-1 on Standard Specifications for Steel. XIV, Part I, 128 (1914).

BARRIER, E. A.

Report of Committee D-11 on Rubber Products. (Secretary.) XIII, 466 (1913); XIV, Part I, 387 (1914); (Chairman.) XV, Part I, 408 (1915); XVI, Part I, 357 (1916); XVII, Part I, 494 (1917); XVIII, Part I, 354 (1918); XIX, Part I, 396 (1919); XX, Part I, 453 (1920).

Standard specifications for rubber products. XV, Part I, 434, 435, 436 (1915).

BASSETT, W. H.

Corrosion cracking of brass. XVIII, Part II, 212, 213 (1918).

Inspection of brass and bronze. XVII, Part II, 228, 233 (1917).

Oxygen in iron and steel. XIII, 488 (1913).

Report of Committee E-4 on Magnification Scales for Micrographs. (Chairman.) XVII, Part I, 508 (1917); XVIII, Part I, 425 (1918); XIX, Part I, 422 (1919); XX, Part I, 475 (1920).

Tinned copper wire. XVII, Part II, 154 (1917).

"Topical Discussion on Season and Corrosion Cracking of Brass: The Causes and Prevention of Corrosion Cracking." XVIII, Part II, 153 (1918).

BATES, P. H.

Autoclave tests for cement. XIII, 776 (1913).

Cement mortars. XIII, 824, 825 (1913).

"Cements Producing Quick-Hardening Concrete." XIX, Part II, 425 (1919).

Excess water in concrete. XVII, Part II, 385, 386 (1917).

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 274 (1917).

Fineness of cement. XIX, Part II, 409 (1919).

Finer grinding of portland cement. XV, Part II, 150, 151 (1915).

Hydration of cement. XIII, 738 (1913).

Microstructure of concretes. XV, Part II, 222 (1915).

Proportioning mortars. XVIII, Part II, 294 (1918).

Quick-hardening cements. XIX, Part II, 439, 442 (1919).

Report of Committee C-1 on Cement. (Secretary.) XVII, Part I, 196 (1917); XVIII, Part I, 270 (1918); XIX, Part I, 262 (1919); XX, Part I, 251 (1920).

Specifications for cement. XVI, Part I, 213 (1916).

"The Effect of Finer Grinding and a Higher SO_3 Content upon the Physical Properties of Portland Cement." XV, Part II, 126 (1915).

BAXTER, F. R.

Report of Sub-Committee III, of Committee D-2, on Sulfur Determination. (Chairman.) XX, Part I, 407 (1920).

Standard tests for lubricants. XV, Part I, 313 (1915).

BAXTER, W. J.

Modern high speed steel. XIX, Part II, 161 (1919).

BEALS, L. N., JR.

"Thermal Activities of Portland Cement During the Period of Setting." XIII, 720 (1913).

BEAN, W. R.

Malleable cast iron. XIX, Part II, 266 (1919).

BEARCE, H. W.

Report of Committee E-1, Appendix: "Standardization of Methods for the Determination of Density." XIX, Part I, 412 (1919).

Report of Sub-Committee V, of Committee D-1, on Linseed Oil, Appendix I: "Supplementary Report on Density and Thermal Expansion of Linseed Oil." XIV, Part I, 262 (1914).

Report of Sub-Committee XII, of Committee D-1, on Turpentine, Appendix I: "Supplementary Report on the Density and Thermal Expansion of Turpentines." XIV, Part I, 333 (1914).

BECHER, EUGEN.

Shipping containers. XIII, 1100 (1913).

BECKER, R. C.

Corrosion cracking of brass. XVIII, Part II, 213 (1918).

BEISTLE, C. P.

"Suggestions as to Standard Specifications to Promote Efficiency and Safety in Explosives Used in Blasting." XIII, 1108 (1913).

BELL, M. L.

"Practical Methods for Testing Refractory Fire Brick." XVI, Part II, 349 (1916).

"Preventable Defects in Refractory Bricks." XIX, Part II, 619 (1919).

Report of Committee C-8, Appendix: "Slag Test for Refractory Brick Used in the Iron and Steel Industry." XVII, Part I, 314 (1917).

BELL, M. L. (*Continued*).
"Suggested Improvements in the Manufacture of Silica Brick." XVII, Part II, 467 (1917).
"The Necessity for Inspection and Testing of Refractory Brick." XVIII, Part II, 336 (1918).

BERRY, H. C.
Strain gages. XIII, 1039 (1913).

BETTS, H. S.
Report of Committee D-7, Appendix II: "Discussion of the Proposed Forest Service Rules for Grading the Strength of Southern Pine Structural Timbers." XV, Part I, 369 (1915).

BEYER, A. H.
Delicate flexure tests. XX, Part II, 387 (1920).

BIERER, J. M.
"An Autographic Friction Testing Machine for Testing Mechanical Rubber Goods." XIV, Part II, 627 (1914).
"Construction of Steam Hose." XX, Part II, 355 (1920).
Construction of steam hose. XX, Part II, 359, 360 (1920).
Testing of rubber goods. XIV, Part II, 634, 637, 638 (1914).

BILLINGS, A. W. K.
"High-Silica Portland Cement." XVII, Part II, 239 (1917).

BINGHAM, E. C.
Measurement of viscosity. XVIII, Part II, 386 (1918).
Mobility of paint. XIX, Part II, 666, 668, 671, 672 (1919).
"Paint, A Plastic Material and not a Viscous Liquid; The Measurement of Its Mobility and Yield Value." XIX, Part II, 640 (1919).
The plastometer and its application. XX, Part II, 486, 492 (1920).
"The Variable-Pressure Method for the Measurement of Viscosity." XVIII, Part II, 373 (1918).

BIXBY, W. H.
Annual Report of the Executive Committee. (President.) XVIII, Part I, 59 (1918).
"Engineering Societies: Their Utilities and Justification." (Annual Address by the President.) XVIII, Part I, 52 (1918).
Microstructure of concretes. XV, Part II, 219 (1915).
Proportioning concrete aggregates. XIV, Part II, 275 (1914).

BLAIR, W. P.
Adoption of standards. XIV, Part II, 649 (1914).
Refractory bricks. XIX, Part II, 633 (1919).
Standard specifications for brick. XIV, Part I, 194 (1914).
Standard specifications for gypsum. XV, Part I, 184 (1915).

BLANCHARD, A. H.
Nomenclature of road materials. XIII, 454 (1913).
Report of Committee D-4, Appendix II: Report of Special Joint Committee Appointed to Consider Provisional Tests of Road Materials. (Chairman.) XV, Part I, 338 (1915).
Report of Committee D-4 on Road Materials. (Chairman.) XIX, Part I, 392 (1919); XX, Part I, 428 (1920).
Standard specifications for brick. XIV, Part I, 192, 194 (1914).

BLEININGER, A. V.

Refractory fire brick. XVI, Part II, 376 (1916).

Report of Committee C-3 on Brick. (Chairman.) XIII, 282 (1913); XIV, Part I, 188 (1914); XV, Part I, 150 (1915). (Acting Chairman.) XIX, Part I, 266 (1919); (Secretary.) XX, Part I, 262 (1920).

Report of Committee C-8 on Refractories. (Chairman.) XVII, Part I, 313 (1917); XVIII, Part I, 287 (1918); XIX, Part I, 315 (1919); XX, Part I, 275 (1920).

Standard specifications for brick. XIV, Part I, 191, 193, 194 (1914).

"Testing of Refractories." XIII, 967 (1913).

BOECK, P. A.

Heat-insulating materials. XVII, Part II, 446 (1917).

BOUGHTON, E. W.

Chinese wood oil. XIII, 946 (1913); XIV, Part II, 464 (1914).

Report of Sub-Committee E, of Committee D-1: "Report of Analyst 2." XIII, 383 (1913).

Report of Sub-Committee III, of Committee D-1, Appendix: "Reports of Analysts on Perilla Oil." XVI, Part I, 278 (1916).

Report of Sub-Committee V, of Committee D-1, Appendix: "Comments of Analysts." XV, Part I, 234 (1915); XVI, Part I, 287 (1916).

"Testing of Chinese Wood Oil." XIII, 923 (1913).

BOYD, D. K.

Powdered admixtures in concrete. XX, Part II, 204 (1920).

Report of Committee C-7 on Lime. (Chairman.) XIX, Part I, 310 (1919); XX, Part I, 271 (1920).

BOYLSTON, H. M.

Brinell hardness testing machines. XX, Part II, 396 (1920).

BOYNTON, C. W.

Road-building rocks. XIII, 994 (1913).

BRACE, P. H.

"Wire Testing Extensometer." XIX, Part II, 695 (1919).

BRAGG, C. T.

Chinese wood oil. XIII, 942, 943 (1913).

Report of Sub-Committee III, of Committee D-1, Appendix: "Reports of Analysts on Perilla Oil." XVI, Part I, 281 (1916).

Report of Sub-Committee IX, of Committee D-1, Appendix: "Reports of Analysts." XVII, Part I, 391, 392, 394, 396, 397, 398, 399, 400, 401 (1917).

Report of Sub-Committee XIII, of Committee D-1, on Shellac. (Chairman.) XIV, Part I, 344 (1914).

BREYER, F. G.

Corrosion cracking of brass. XVIII, Part II, 212 (1918).

Mobility of paint. XIX, Part II, 668, 674 (1919).

BRONSON, C. B.

Deep etching of rails and forgings. XIX, Part II, 200 (1919).

BROOKS, BENJAMIN.

Failure of a tile drain. XVII, Part II, 464 (1917).

BROOKS, C. K.

Cast steel chain. XVIII, Part II, 117, 145 (1918).

BROWN, A. L.

"Quantitative Determination of Body and Solvent in Varnish." XIV, Part II, 466 (1914).

BROWN, C. G.

Compressive strength of concrete. XVII, Part II, 377 (1917).

Corrosion of iron and steel. XVII, Part I, 175 (1917).

BROWN, H. J.

Standard specifications for gypsum. XV, Part I, 184 (1915).

BUCK, D. M.

Corrosion of iron and steel. XIX, Part I, 246 (1919).

Corrosion of steel. XIX, Part II, 244 (1919).

Corrosion tests. XVIII, Part I, 242 (1918).

"The Influence of Very Low Percentages of Copper in Retarding the Corrosion of Steel." XIX, Part II, 224 (1919).

BUCKINGHAM, F.

Standard methods of testing. XIV, Part I, 408 (1914).

BUREAU OF CONSTRUCTION AND REPAIR, U. S. N.

Modern high speed steel. XIX, Part II, 161 (1919).

BURGESS, G. K.

Fatigue of copper alloys. XV, Part I, 109 (1915).

Finishing temperatures of rails. XV, Part I, 115 (1915).

Heat treatment of steel. XV, Part II, 23 (1915).

Non-ferrous metals and alloys. XV, Part I, 139 (1915).

Report of Sub-Committee II, of Committee A-5, on Preservative Metallic Coatings for Metals. (Chairman.) XX, Part I, 147 (1920).

Testing galvanized coatings. XX, Part II, 422 (1920).

BURLEIGH, W. F.

Report of Sub-Committee IX, of Committee D-1, Appendix: "Reports of Analysts." XVII, Part I, 394, 395, 399, 400, 401 (1917).

BURROWS, C. W.

Alloy steels. XVII, Part II, 45 (1917).

Magnetic analysis. XIX, Part II, 138 (1919).

"Magnetic Criteria of the Mechanical Properties of a One-per-cent-carbon Steel." XIII, 570 (1913).

Magnetic habits of alloy steels. XIV, Part II, 67 (1914).

Magnetic testing. XVII, Part II, 107, 112 (1917).

Report of Committee A-8 on Magnetic Analysis. (Chairman.) XX, Part I, 231 (1920).

Report of Committee A-6 on Magnetic Properties of Iron and Steel. (Chairman.) XIV, Part I, 170 (1914); XVI, Part I, 171 (1916); XVIII, Part I, 243 (1918).

Report of Committee E-5, Appendix II: Statement of Sub-Committee on Classification of Standing Committees and Standards. XVII, Part I, 519 (1917).

"Some Applications of Magnetic Analysis to the Study of Steel Products." XVII, Part II, 87 (1917).

"Topical Discussion on Magnetic Analysis: Magnetic Analysis as a Criterion of the Quality of Steel and Steel Products." XIX, Part II, 5 (1919).

C

CAIN, J. R.

Report of Committee A-1, Appendix II: Report on Ladle-Test Ingot Investigation. XIX, Part I, 154 (1919).

Report of Committee A-1, Appendix IV: "Report on Investigation of Ladle-Test Steel Ingots." XVI, Part I, 129 (1916).

CAMP, A. D.

Coal ash. XV, Part II, 344 (1915).

Definition of the word "vitrified." XV, Part II, 266 (1915).

CAMPBELL, J. H.

Tin, terne and lead-coated sheets. XIV, Part II, 170 (1914).

CAMPBELL, W. E.

"Rubber Belting and Methods of Testing." XIV, Part II, 617 (1914).

Testing of rubber goods. XIV, Part II, 624, 625, 626 (1914).

CAMPBELL, WILLIAM.

A failed axle. XIV, Part II, 84 (1914).

Annealing temperatures and grain growth. XVII, Part II, 77 (1917).

"A Note on the Constitution of Certain Tin-Bearing Brasses." XX, Part II, 104 (1920).

Cast zinc. XIII, 698 (1913).

Hardness of copper wire. XVII, Part II, 126 (1917).

"Lead-Tin-Antimony and Tin-Antimony-Copper Alloys." XIII, 630 (1913).

Macroscopic etching of steel. XV, Part II, 96 (1915).

Non-ferrous alloys. XIII, 667, 668 (1913).

Non-ferrous metals and alloys. XV, Part I, 143 (1915).

Report of Committee B-2 on Non-Ferrous Metals and Alloys. (Chairman.) XIII, 206 (1913); XIV, Part I, 178 (1914); XV, Part I, 137 (1915); XVI, Part I, 180 (1916); XVII, Part I, 178 (1917); XVIII, Part I, 246 (1918); XIX, Part I, 253 (1919); XX, Part I, 234 (1920).

Specifications for Babbitt metals. XVIII, Part I, 262 (1918).

Specifications for non-ferrous metals and alloys. XX, Part I, 248 (1920).

Specifications for non-ferrous railway equipment. XVIII, Part I, 264, 266 (1918).

Tinned copper wire. XVII, Part II, 154 (1917).

"Topical Discussion on Season and Corrosion Cracking of Brass: Season Cracking and Splitting of Condenser Tubes and Pipes." XVIII, Part II, 147 (1918).

CAPP, J. A.

Addendum to Report of Committee A-1. (Chairman.) XVIII, Part I, 128 (1918); XIX, Part I, 171 (1919).

Annual Address by the President. XX, Part I, 30 (1920).

Annual Report of the Executive Committee. (President.) XX, Part I, 43 (1920).

"A Rational Test for Metallic Protective Coatings." XIV, Part II, 474 (1914).

Bearing metals. XIII, 713 (1913).

Corrosion of metals. XIII, 627 (1913).

Deep etching of rails and forgings. XIX, Part II, 189 (1919).

Heating test of asphalts. XVII, Part II, 636, 637, 638, 639 (1917).

Heat treatment of steel. XIII, 530 (1913).

"Method for Studying the Effects of Temperature upon the Physical Condition of Asphalts, Waxes, etc." XVII, Part II, 627 (1917).

Report of Committee A-1 on Steel. (Chairman.) XVIII, Part I, 100 (1918); XIX, Part I, 138 (1919).

Report of Committee B-1 on Standard Specifications for Copper Wire. (Chairman.) XIII, 198 (1913); XIV, Part I, 176 (1914); XV, Part I, 133 (1915); XVI, Part I, 177 (1916); XIX, Part I, 250 (1919).

Report of Sub-Committee III, of Committee B-2, on Sand-Cast Metals and Alloys. XVII, Part I, 188 (1917).

Specifications for boiler steel for locomotives. XVIII, Part I, 138 (1918).

CAPP, J. A. (*Continued*).
Specifications for cold-drawn steel. XIII, 195 (1913).
Specifications for non-ferrous railway equipment. XVIII, Part I, 268 (1918).
Specifications for structural steel for cars. XVIII, Part I, 136, 137, 138 (1918).
Standard methods of testing. XIV, 397 (1914).
Standard specifications for steel. XIV, Part I, 132, 133, 134, 135 (1914).
Test for metallic coatings. XIV, Part II, 480, 481 (1914).
Textile materials. XVI, Part I, 388 (1916).
Tinned copper wire. XVII, Part II, 153 (1917).
Wrought non-ferrous materials. XIV, Part II, 142, 144 (1914).
Yield point and proportional limit. XVI, Part II, 445 (1916).

CARHART, P. E.
Rail failures. XIII, 594 (1913).
Report of Committee A-1, Appendix V: Report on Permissible Variations in Weight and Gage of Sheared Plates. XIV, Part I, 125 (1914).

CARNAHAN, R. B., JR.
Corrosion of iron and steel. XVII, Part I, 176 (1917).

CARPENTER, A. W.
Corrosion of metals. XIII, 626, 627 (1913).
Inspection of Havre de Grace Bridge. XIV, Part I, 352, 354 (1914).
Metal primer tests. XVII, Part II, 544 (1917).
Preservative coatings for structural materials. XIV, Part I, 352, 354 (1914).
Report of Sub-Committee XIV, of Committee D-1, on the Preparation of Iron and Steel Surfaces for Painting. (Chairman.) XVI, Part I, 293 (1916); XVII, Part I, 451 (1917); XVIII, Part I, 310 (1918); XIX, Part I, 374 (1919).
Standard specifications for timber. XV, Part I, 402, 403 (1915).
"Tests on the Rate of Corrosion of Metals." XIII, 617 (1913).

CARPENTER, R. C.
Autoclave tests for cement. XIII, 771 (1913).

CARSON, H. Y.
Cast-iron soil pipe. XVII, Part I, 135 (1917).

CASSIL, H. A.
Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

CHAMBERLAIN, O. P.
Slag concrete. XIV, Part II, 296 (1914).

CHAMBERLIN, C. G.
Ductility testing machines. XX, Part II, 404 (1920).

CHAPMAN, CLOYD M.
Adoption of standards. XIV, Part II, 657 (1914).
"A Fungus Bed Test of Wood Preservatives." XV, Part II, 267 (1915).
"A New Form of Specifications for Concrete Aggregates." XVI, Part II, 180 (1916).
Brass condenser tubes. XVI, Part II, 173, 175 (1916).
Corrosion of metals. XIII, 627 (1913).
Metal primer tests. XVII, Part II, 544 (1917).
"Method and Apparatus for Determining Consistency." XIII, 1045 (1913).
Mobility of paint. XIX, Part II, 671, 673, 674 (1919).

CHAPMAN, CLOYD, M. (*Continued*).

Proportioning of concrete aggregates. XIV, Part II, 267 (1914); XV, Part II, 161 (1915).

Report of Committee C-9, Appendix III: Report of Sub-Committee VI on Weight, Voids, Density, Specific Gravity and Consistency. (Chairman.) XX, Part I, 340 (1920).

Report of Sub-Commitee XI, of Committee D-1, on Paint Thinners other than Turpentine. (Chairman.) XIV, Part I, 312 (1914); XV, Part I, 259 (1915); XVI, Part I, 290 (1916); XVII, Part I, 402 (1917); XVIII, Part I, 309 (1918); XIX, Part I, 364 (1919).

Specifications for cement. XVI, Part I, 211, 212 (1916).

Specifications for concrete aggregates. XVI, Part II, 189, 192 (1916).

Specifications for lime. XIII, 325 (1913).

Specifications for wooden paving blocks. XVIII, Part I, 346 (1918).

Test for distillation of paint thinners other than turpentine. XV, Part I, 272 (1915).

"Testing Concrete Aggregates." XIV, Part II, 298 (1914).

Testing concrete aggregates. XIV, Part II, 308 (1914).

CHARLES, V. K.

Report of Sub-Committee X, of Committee D-1, Appendix: "Fungi Occurring on the White-Paint Test Fence at Washington, D. C." XV, Part I, 257 (1915).

CHASE, C. E.

Non-ferrous metals and alloys. XV, Part I, 140 (1915).

CHATBURN, G. R.

Concrete failures. XIV, Part II, 330 (1914).

CHEESMAN, F. P.

Metal primer tests. XVII, Part II, 544 (1917).

Permeability test of paints. XIV, Part II, 439 (1914).

CHURCH, S. R.

Consistency tester. XVII, Part II, 624 (1917).

"Some Experiments on Technical Bitumens." XV, Part II, 274 (1915).

Specifications for wooden paving blocks. XVIII, Part I, 344 (1918).

Technical bitumens. XV, Part II, 295 (1915).

"Topical Discussion on Cooperation in Industrial Research: Cooperation between Governmental Bureaus and the Industries in Research on War Problems." XVIII, Part II, 66 (1918).

CLAMER, G. H.

Annual Report of the Executive Committee. (President.) XIX, Part I, 95 (1919).

Fatigue of copper alloys. XV, Part II, 110 (1915).

"Memorial Session in Honor of the Memory of Edgar Marburg: Introductory Remarks on behalf of the Executive Committee." XIX, Part I, 41 (1919).

Non-ferrous alloys. XIII, 666, 667, 668 (1913).

Non-ferrous castings. XIV, Part II, 160 (1914).

Report of Sub-Committee III, of Committee B-2, on Sand-Cast Metals and Alloys. XVII, Part I, 186 (1917).

Specifications for Babbitt metals. XVIII, Part I, 262 (1918).

Specifications for manganese bronze ingots. XIV, Part I, 181 (1914).

Specifications for non-ferrous railway equipment. XVII, Part I, 264, 266, 268 (1918).

CLAMER, G. H. (*Continued*).

"Standardization." (Annual Address by the President.) XIX, Part I, 80 (1919).

Test for metallic coatings. XIV, Part II, 480 (1914).

Wrought non-ferrous materials. XIV, Part II, 141 (1914).

CLARK, K. A.

Abrasion test of rock. XX, Part II, 293 (1920).

"The Sampling of Deposits of Road Stone and Gravel in the Field." XVIII, Part II, 393 (1918).

COLBY, A. L.

Methods for analysis of cast iron. XV, Part I, 127 (1915).

Specifications for boiler steel for locomotives. XVIII, Part I, 139 (1918).

COLE, E. J.

Report of Sub-Committee IX, of Committee D-1, Appendix: "Reports of Analysts." XVII, Part I, 395, 399, 400, 401 (1917).

COLE, F. J.

Addendum to Report of Committee A-1: Report of Sub-Committee XI on Boiler Steel. (Chairman.) XVIII, Part I, 129 (1918).

COLEMAN, R. E.

Metal primer tests. XVII, Part II, 547 (1917).

COLLINGS, W. A.

Splices in reinforcement bars. XVI, Part II, 234 (1916).

COLLINS, T. R.

Report of Sub-Committee III, of Committee D-1, Appendix: "Reports of Analysts on Lumbang and Perilla Oils." XVII, Part I, 370 (1917).

COMSTOCK, G. F.

Aluminum bronze. XVI, Part II, 145, 150 (1916).

"Aluminum Bronze: Some Recent Tests and Their Significance." XVI, Part II, 117 (1916).

Deep etching of rails and forgings. XIX, Part II, 204 (1919).

Fatigue tests of aluminum alloys. XX, Part II, 134 (1920).

Magnification scales for micrographs. XVII, Part I, 509 (1917).

Shattered zones in steel rails. XX, Part II, 60 (1920).

CONRADSON, P. H.

Emulsification of lubricating oils. XVI, Part II, 266, 269, 270, 281 (1916).

"Emulsification of Mineral Lubricating Oils: Apparatus and Test Method." XVI, Part II, 273 (1916).

"Internal-Combustion Engine: Lubrication and Lubricants." XVIII, Part II, 387 (1918).

Lubrication testing apparatus. XV, Part II, 412, 414 (1915).

Minority Report of Committee D-2 on Standard Tests for Lubricants. XV, Part I, 275 (1915).

Report of Committee D-2, Appendix: Report of Sub-Committee on Evaporation Tests." (Chairman.) XVIII, Part I, 323 (1918).

Standard tests for lubricants. XIV, Part I, 368, 369, 370 (1914); XV, Part I, 309, 315, 323 (1915).

CONWELL, E. L.

Quick-hardening cements. XIX, Part II, 440 (1919).

Report of Committee C-7 on Lime. (Secretary.) XIII, 313 (1913); XIV, Part I, 213 (1914); XV, Part I, 167 (1915); XVII, Part I, 312 (1917).

COOK, O. U.
Reinforcing bars. XIV, Part II, 107 (1914).

COOPER, W. A.
Report of Sub-Committee V, of Committee A-5, on Total Immersion Tests. (Chairman.) XX, Part I, 227 (1920).

CORSE, W. M.
Aluminum bronze. XVI, Part II, 145, 147 (1916).
"Aluminum Bronze: Some Recent Tests and Their Significance." XVI, Part II, 117 (1916).
Non-ferrous castings. XIV, Part II, 159, 160 (1914).
Non-ferrous metals. XVI, Part I, 198 (1916).
Non-ferrous metals and alloys. XIV, Part I, 182 (1914).
Report of Sub-Committee III, of Committee B-2, on Sand-Cast Metals and Alloys. XVII, Part I, 190 (1917).

COWAN, W. A.
Bearing metals. XIII, 712 (1913).

COWDREY, I. H.
Hardness testing. XVIII, Part II, 466 (1918).
"Transverse Testing Under Non-Uniformly Distributed Load with Special Application to Airplane Wing Ribs." XVIII, Part II, 429 (1918).

COX, H. J.
"Cast Steel Anchor Chain." XVIII, Part II, 98 (1918).
Cast steel chain. XVIII, Part II, 145 (1918).

COYLE, F. B,
Specifications for carbon tool steel. XVII, Part I, 124 (1917).

CROCKETT, A. E.
Addendum to Report of Committee A-1: Report of Sub-Committee XVI on Cast Steel Chain. (Secretary.) XVIII, Part I, 133 (1918).

CROMWELL, O. C.
Specifications for boiler steel for locomotives. XVIII, Part I, 140 (1918).
Specifications for structural steel for cars. XVIII, Part I, 138 (1918).

CROSBY, W. W.
Report of Committee D-4, Appendix I: Report of Special Joint Committee Appointed to Consider Definitions of Road Materials. XV, Part I, 336 (1915).

CROWE, J. J.
Finishing temperatures of rails. XV, Part I, 119 (1915).

CROWN, H. A.
Report of Sub-Committee E, of Committee D-1: "Report of Analyst 5." XIII, 389 (1913).

CRUM, R. W.
"Failure of a 30-in. Tile Drain at Albert Lea, Minnesota." XVII, Part II, 453 (1917).
Failure of a tile drain. XVII, Part II, 465 (1917).
Proportioning of concrete. XIX, Part II, 508 (1919).
"Proportioning of Pit-run Gravel for Concrete." XIX, Part II, 458 (1919).

CUSHING, W. C.
Hardness tests. XIV, Part II, 75 (1914).

CUSHMAN, A. S.

"A New Method of Testing Galvanized Coatings." XX, Part II, 411 (1920).
Autoclave tests for cement. XIII, 781 (1913).
Cement mortars. XIII, 821 (1913).
Corrosion of iron and steel. XIX, Part I, 241 (1919).
Corrosion of metals. XIII, 625 (1913).
Corrosion of steel. XIX, Part II, 238 (1919).
Corrosion tests. XVIII, Part I, 240 (1918).
Oxygen in iron and steel. XIII, 487 (1913).
Testing galvanized coatings. XX, Part II, 425 (1920).

D

DARKE, J. M.

Alloy steels. XVII, Part II, 56 (1917).
Specifications for carbon tool steel. XVII, Part I, 124, 125, 126 (1917).

DAUCH, J. J.

Shipping containers. XIII, 1103 (1913).

DAVIES, G. C.

Report of Committee A-3 on Cast Iron. (Secretary.) XVII, Part I, 133 (1917); XVIII, Part I, 156 (1918).
Report of Committee A-3 on Standard Specifications for Cast Iron and Finished Castings. (Secretary.) XIV, Part I, 147 (1914); XV, Part I, 123 (1915); XVI, Part I, 150 (1916).

DAVIS, C. H.

"Testing of Sheet Brass." XVII, Part II, 164 (1917).
Testing of sheet brass. XVII, Part II, 202 (1917).

DAVIS, M. P.

Molybdenum in structural steels. XX, Part II, 29 (1920).

DAVIS, WATSON.

Consistency and workability of concrete. XX, Part I, 442 (1920).
Proportioning of concrete. XIX, Part II, 497 (1919).
Proportioning mortars. XVIII, Part II, 295 (1918).

DAY, D. T.

Nomenclature of road materials. XIII, 456 (1913).

DEACON, R. W.

Non-ferrous metals and alloys. XIX, Part I, 260 (1919).

DE FOREST, A. V.

"A Simple Type of Brinell Testing Machine for 500 kg. Load." XVIII, Part II, 449 (1918).
Corrosion cracking of brass. XVIII, Part II, 205 (1918).
Hardness of copper wire. XVII, Part II, 126 (1917).
Hardness testing. XVIII, Part II, 466 (1918).
Inspection of brass and bronze. XVII, Part II, 237 (1917).
Plastic elongation of wire. XVI, Part II, 468 (1916).
"Some Experiments on the Plastic Elongation of Wire." XVI, Part II, 455 (1916).

DELBRIDGE, T. G.

Report of Committee D-2, Appendix: "Determination of Resistance of Lubricating Oils to Emulsification." XX, Part I, 416 (1920).
Report of Sub-Committee V, of Committee D-2, on Emulsification. (Chairman.) XX, Part I, 415 (1920).

DEVRIES, R. P.

Aluminum bronze. XVI, Part II, 146, 147, 149 (1916).
Brass condenser tubes. XVI, Part II, 174 (1916).
Corrosion tests. XVIII, Part I, 241 (1918).
Hardness of steel. XVI, Part II, 51 (1916).
Heat treatment of axles. XVI, Part II, 67, 71 (1916).
Heat treatment of steel. XIII, 526 (1913).
Magnetic analysis. XIX, Part II, 136 (1919).
Magnetic habits of alloy steels. XIV, Part II, 69 (1914).
Magnetic testing. XVII, Part II, 110 (1917).
"Mechanical Tests of Heat-Treated Spring Steel." XIII, 550 (1913).
Molybdenum in structural steels. XX, Part II, 29 (1920).
Resistance of steels to wear. XIII, 568 (1913).
Specifications for carbon tool steel. XVII, Part I, 126, 129 (1917).
Tests of heat-treated spring steel. XIII, 561 (1913).
Yield point and proportional limit. XVI, Part II, 438 (1916).

DEWAR, JOHN.

Paint protection for portland cement surfaces. XIV, Part II, 492 (1914).
Report of Sub-Committee IX, of Committee D-1, Appendix: "Reports of Analysts." XVII, Part I, 394, 396, 398, 399, 400 (1917).

DE WYRALL, CYRIL.

Report of Committee D-8 on Waterproofing Materials. (Secretary.) XIII, 459 (1913); XV, Part I, 405 (1915).

DICKINSON, H. C.

Report of Sub-Committee IX, of the Joint Committee on Coal Analysis, on Calorimetric Determination. (Chairman.) XIV, Part I, 444 (1914).

DILLER, H. E.

Report of Committee A-7 on Malleable Castings. (Chairman.) XIX, Part I, 248 (1919).

DISBRO, G. A.

"Screen-Scale Sieves Made to a Fixed Ratio." XIII, 1053 (1913).

DIX, E. H. JR.

Fatigue tests of steel. XIX, Part II, 219 (1919).
"The Single Blow Notched Bar Impact Test as Used in the American Industry." XIX, Part II, 720 (1919).

DOUTY, D. E.

Construction of steam hose. XX, Part II, 359 (1920).
Report of Committee A-10 on Hardness Tests. (Chairman.) XIII, 196 (1913).
Report of Committee C-3 on Standard Specifications for Brick. (Secretary.) XIII, 282 (1913); XIV, Part I, 188 (1914); XV, Part I, 150 (1915).
Report of Committee D-13 on Textile Materials. (Acting Secretary.) XV, Part I, 440 (1915); XVI, Part I, 360 (1916). (Secretary.) XVIII, Part I, 357 (1918); XIX, Part I, 400 (1919). (Secretary.) XX, Part I, 455 (1920).
Standard specifications for gypsum. XV, Part I, 182, 185 (1915).
Strain gages. XIII, 1042 (1913).

DOW, A. W.

Consistency tester. XVII, Part II, 623 (1917).
Report of Committee D-4, Appendix IV: Report of Sub-Committee on Ductility Tests. (Chairman.) XV, Part I, 349 (1915).

DuCOMB, W. C., JR.

Standard tests for lubricants. XIV, Part I, 370 (1914).

DUDLEY. P. H.

"Topical Discussion on Magnetic Analysis: Magnetic Surveys on New and Failed Rails." XIX, Part II, 51 (1919).

DUNBAR, W. O.

Minority Report of Committee D-2 on Standard Tests for Lubricants. XIV, Part I, 366 (1914); XV, Part I, 275 (1915).

Standard tests for lubricants. XIV, Part I, 368 (1914); XV, Part I, 303 (1915).

DUNLAP, J. H.

Report of Committee D-13, Appendix III: "Effect of Jaws on Fabric Strength." XX, Part I, 469 (1920).

DUNN, B. W.

"Conservation and Shipping Containers." XIII, 1072 (1913).

Report of Committee D-10 on Shipping Containers. (Chairman.) XVI, Part I, 349 (1916); XVII, Part I, 493 (1917); XVIII, Part I, 350 (1918).

Shipping containers. XIII, 1106 (1913).

Simple overstrain. XIV, Part II, 36, 37 (1914).

E

EASBY, WILLIAM, JR.

"Memorial Session in Honor of the Memory of Edgar Marburg; Personal Tribute." XIX, Part I, 77 (1919).

EDGECOMB, H. R.

Testing of rubber goods. XIV, Part II, 634 (1914).

EDWARDS, E. J.

Specifications for non-ferrous railway equipment. XVIII, Part I, 267, 268 (1918).

EDWARDS, L. N.

Compressive strength of concrete. XVII, Part II, 376 (1917).

"Effects of Grading of Sands and Consistency of Mix upon the Strength of Plain and Reinforced Concrete." XVII, Part II, 301 (1917); XVIII, Part II, 303 (1918).

Excess water in concrete. XVII, Part II, 388 (1917).

Proportioning mortars. XVIII, Part II, 299 (1918).

Proportioning of concrete. XIX, Part II, 486 (1919).

"Proportioning the Materials of Mortars and Concretes by Surface Areas of Aggregates." XVIII, Part II, 235 (1918).

Strength of concrete. XVII, Part II, 358, 362 (1917).

EHRENFELD, C. H.

Specifications for carbon tool steel. XVII, Part I, 127 (1917).

ELLIOTT, G. K.

Inspection of brass and bronze. XVII, Part II, 234 (1917).

Non-ferrous metals. XVI, Part I, 193, 196 (1916).

ELMENDORF, ARMIN.

"The Uses and Properties of Water-Resistant Plywood." XX, Part II, 324 (1920).

EMLEY, W. E.

Cement-lime-sand mortars. XVII, Part II, 277 (1917).

"Properties of Cement-Lime-Sand Mortars." XVII, Part II, 261 (1917).

EMLEY, W. E. (*Continued*).
Report of Committee C-11 on Gypsum. (Chairman.) XX, Part I, 380 (1920).
Specifications for lime. XIII, 323 (1913).
"Strength of Lime Mortar." XIV, Part II, 338 (1914).

ENRIGHT, BERNARD.
Autoclave tests for cement. XIII, 770 (1913).
Cement. XVII, Part I, 198 (1917).
Compressive strength of concrete. XVII, Part II, 375 (1917).
Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 264 (1917).
Fineness of cement. XIX, Part II, 410 (1919).
Specifications for cement. XVI, Part I, 214 (1916).

F

FAHY, F. P.
Magnetic testing. XVII, Part II, 110 (1917).
"Topical Discussion on Magnetic Analysis: Magnetic Analysis as a Criterion of the Quality of Steel and Steel Products." XIX, Part II, 5 (1919).

FAIRBURN, W. A.
Shipping containers. XIII, 1102 (1913).

FARMER, F. M.
"Fatigue Testing Machine." XIX, Part II, 709 (1919).
Fatigue testing machine. XIX, Part II, 719 (1919).

FAY, HENRY.
Alloy steels. XVII, Part II, 54 (1917).

FEHR, R. B.
Distribution of earth pressures. XVII, Part II, 655 (1917).

FEILD, A. L.
"The Fusibility of Coal Ash." XV, Part II, 297 (1915).

FERGUSON, L. R.
Autoclave tests for cement. XIII, 767 (1913).
Report of Committee C-9 on Concrete and Concrete Aggregates. (Secretary.) XV, Part I, 173 (1915); XVI, Part I, 264 (1916); XVII, Part I, 319 (1917).
Specifications for concrete aggregates. XVI, Part II, 188 (1916).

FIELDNER, A. C.
Coal ash. XV, Part II, 344, 345, 346 (1915).
Report of Committee D-6 on Coke. (Secretary.) XV, Part I, 359 (1915); XVI, Part I, 325 (1916); XVIII, Part I, 335 (1918); XX, Part I, 445 (1920).
Report of Sub-Committe I, of the Joint Committee on Coal Analysis, on Preparation of Laboratory Samples. (Chairman.) XIV, Part I, 412 (1914).
Report of Sub-Committee VIII, of the Joint Committee on Coal Analysis, on Ultimate Analysis. (Chairman.) XIV, Part I, 436 (1914).
"The Fusibility of Coal Ash." XV, Part II, 297 (1915).

FINN, A. N.
Mobility of paint. XIX, Part II, 674 (1919).
Report of Committee A-5, Appendix IV: "Method of Making the Salt-Spray Corrosion Test." XVIII, Part I, 237 (1918).
Testing galvanized coatings. XX, Part II, 425 (1920).

FIREMAN, PETER.
Permeability test of paints. XIV, Part II, 439 (1914).

FISCHER, M. F.
"Topical Discussion on Magnetic Analysis: Application of Magnetic Analysis to the Testing of Ball Bearing Races." XIX, Part II, 68 (1919).

FLEMING, W. R.
"Oxygen in Iron and Steel: Value of Existing Methods for Its Determination." XIII, 477 (1913).

FLINN, A. D.
Corrosion cracking of brass. XVIII, Part II, 201 (1918).
"Inspection of Brass and Bronze." XVII, Part II, 212 (1917).
Inspection of brass and bronze. XVII, Part II, 224, 236, 238 (1917).
"Topical Discussion on Cooperation in Industrial Research: Development of Existing Agencies." XVIII, Part II, 43 (1918).

FLOWERS, A. E.
Absolute viscosity. XVII, Part II, 569 (1917).
"A Cylinder Friction and Lubrication Testing Apparatus." XV, Part II, 399 (1915).
Lubrication testing apparatus. XV, Part II, 413, 414 (1915).
Magnetic habits of alloy steels. XIV, Part II, 70, 71 (1914).
Pressures on walls and bins. XV, Part II, 395 (1915).
Standard tests for lubricants. XV, Part I, 306, 312, 316, 317 (1915).
"Viscosity Measurement and a New Viscosimeter." XIV, Part II, 565 (1914).
Viscosity of lubricants. XIX, Part I, 389 (1919).

FORCE, H. J.
"Additional Results Obtained with the Autoclave Test for Portland Cement." XIV, Part II, 246 (1914).
Autoclave tests for cement. XIII, 790 (1913); XIV, Part II, 254 (1914).
Compressive strength of concrete. XVII, Part II, 377 (1917).
Deep etching of rails and forgings. XIX, Part II, 201, 204 (1919).
Finer grinding of portland cement. XV, Part II, 151 (1915).
Metal primer tests. XVII, Part II, 543 (1917).
"Results Obtained with the Autoclave Tests for Cement." XIII, 740 (1913).
"Steam Hose." XIX, Part II, 687 (1919).
Volume changes in cement. XIV, Part II, 244 (1914).

FORREST, C. N.
"Extractor for Bituminous Paving Mixtures." XIII, 1069 (1913).
Minority Report of Committee D-4 on Standard Tests for Road Materials. XIII, 450 (1913).
Specifications for wooden paving blocks. XVIII, Part I, 340 (1918).
Technical bitumens. XV, Part II, 294 (1915).
Waterproofing. XIII, 959 (1913).

FORT, E. J.
Report of Committee C-4 on Clay and Cement Sewer Pipe. (Secretary.) XIII, 302 (1913); XIV, Part I, 195 (1914); XV, Part I, 163 (1915); XVI, Part I, 220 (1916); XVII, Part I, 293 (1917).

FOSTER, BENJAMIN.
Waterproofing. XIII, 961 (1913).

FOWLER, G. L.
Adoption of standards. XIV, Part II, 649 (1914).
Chilled cast iron. XIV, Part II, 125 (1914).
Pressures on walls and bins. XV, Part II, 395 (1915).
Resistance of steels to wear. XIII, 568 (1913).
Standard methods of testing. XIV, Part I, 406 (1914).

FRANCKE, W. J.
"An Apparatus for Delicate Flexure Tests and Some Results of Such Tests." XX, Part II, 372 (1920).
Delicate flexure tests. XX, Part II, 389 (1920).

FRASER, N. D.
Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

FROST, E. C.
"Specifications and Tests of Glue." XIV, Part II, 508 (1914).

FRY, L. H.
Heat treatment of axles. XVI, Part II, 73, 78 (1916).
Yield point and proportional limit. XVI, Part II, 440 (1916).

FULLER, J. W., JR.
Autoclave tests for cement. XIII, 786 (1913).

FULLER, W. B.
Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

FULWEILER, W. H.
Refractory fire brick. XVI, Part II, 375 (1916).
Report of Committee C-8 on Refractories. (Secretary.) XVIII, Part I, 287 (1918); XIX, Part I, 315 (1919); XX, Part I, 275 (1920).
Specifications for wooden paving blocks. XVIII, Part I, 341, 344 (1918).

FURNESS, RADCLYFFE.
Heat treatment of steel. XV, Part II, 25 (1915).

G

GAGE, R. B.
Asphalt content of road oils. XX, Part II, 322 (1920).

GAINES, R. H.
Corrosion of metals. XIII, 627 (1913).

GARDNER, H. A.
Acceptability of linseed oil. XVI, Part II, 246 (1916).
Chinese wood oil. XIII, 943, 946 (1913).
Hiding power of paints. XX, Part II, 437 (1920).
"Metal Primer Tests." XVII, Part II, 531 (1917).
Metal primer tests. XVII, Part II, 548 (1917).
Mobility of paint. XIX, Part II, 670 (1919).
"Paint Protection for Portland-Cement Surfaces." XIV, Part II, 482 (1914).
Paint protection for portland-cement surfaces. XIV, Part II, 498 (1914).
Permeability test of paints. XIV, Part II, 444 (1914).
Priming values of paints. XIII, 954 (1913).

GARDNER, H. A. (*Continued*).

Report of Sub-Committee III, of Committee D-1, on Testing of Paint Vehicles. (Chairman.) XIV, Part I, 237 (1914); XV, Part I, 204 (1915); XVI, Part I, 273 (1916); XVII, Part I, 365 (1917); XIX, Part I, 363 (1919); XX, Part I, 390 (1920).

Report of Sub-Committee III, of Committee D-1, Appendix: "Reports of Analysts on Perilla Oil." XVI, Part I, 275 (1916).

Report of Sub-Committee III, of Committee D-1, Appendix: "Reports of Analysts on Lumbang and Perilla Oils." XVII, Part I, 366 (1917).

Report of Sub-Committee IV, of Committee D-1, on Inspection of Steel Plates at Atlantic City. (Chairman.) XIV, Part I, 259 (1914); XV, Part I, 214 (1915).

Report of Sub-Committee C, of Committee D-1, on Paint Vehicles (Chairman.) XIII, 350 (1913).

Report of Sub-Committee D, of Committee D-1, on the Atlantic City Steel Paint Tests. (Chairman.) XIII, 369 (1913).

GARDNER, HARRY.

Powdered admixtures in concrete. XX, Part II, 207 (1920).

GEBERT, N. J.

"Topical Discussion on Magnetic Analysis: A Systematic Investigation of the Correlation of the Magnetic and Mechanical Properties of Steel." XIX, Part II, 117 (1919).

GEHRIG, A. G.

Fatigue tests of steel. XIX, Part II, 220 (1919).

"Some Fatigue Tests of Nickel Steel and Chrome-Nickel Steel." XIX, Part II, 206 (1919).

GIBBONEY, J. H.

Corrosion of iron and steel. XVII, Part I, 175, 176 (1917).

Corrosion tests. XVIII, Part I, 240, 241, 242 (1918).

Methods for analysis of cast iron. XV, Part I, 129 (1915).

Report of Committee A-1, Appendix II: Report of Sub-Committee XII on Ladle Test Ingot Investigation. (Chairman.) XIX, Part I, 154 (1919).

Report of Sub-Committee III, of Committee A-5, on Inspection of the Fort Sheridan, Pittsburgh and Annapolis Tests. (Chairman.) XIX, Part I, 181 (1919); XX, Part I, 148 (1920).

Specifications for boiler steel for locomotives, XVIII, Part I, 139 (1918).

Specifications for steel tie plates. XVII, Part I, 122 (1917).

GIBBS, A. W.

Addresses by Past-Presidents. XVII, Part I, 50 (1917).

Adoption of standards. XIV, Part II, 649, 654, 659 (1914).

A failed axle. XIV, Part II, 88 (1914).

Annual Report of the Executive Committee. (President.) XV, Part I, 42 (1915).

Bearing metals. XIII, 713 (1913).

Cast zinc. XIII, 698 (1913).

Coal ash. XV, Part II, 344 (1915).

Heat treatment of steel. XIII, 532 (1913).

Magnetic testing. XVII, Part II, 110 (1917).

Non-ferrous alloys. XIII, 666 (1913).

"Our Rail Specifications." (Annual Address by the President.) XV, Part I, 32 (1915).

Pressures on walls and bins. XV, Part II, 396 (1915).

GIBBS, A. W. (*Continued*).
Specifications for non-ferrous railway equipment. XVIII, Part I, 267 (1918).
Testing of rubber goods. XIV, Part II, 634 (1914).

GIBSON, W. A.
"Fatigue and Impact Fatigue Tests of Aluminum Alloys." XX, Part II, 115 (1920).
Fatigue testing machine. XIX, Part II, 718 (1919).
Fatigue tests of aluminum alloys. XX, Part II, 135 (1920).

GIESECKE, F. E.
"Effect of Rodding Concrete." XX, Part II, 219 (1920).
Effect of rodding concrete. XX, Part II, 231 (1920).

GILL, A. H.
Minority Report of Committee D-2 on Standard Tests for Lubricants. XIV, Part I, 366 (1914).
Report of Committee D-2 on Standard Tests for Lubricants. (Chairman.) XIV, Part I, 356 (1914).

GINSBURG, S.
Report of Sub-Committee E, of Committee D-1: "Report of Analyst 3." XIII, 385 (1913).

GODFREY, EDWARD.
Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

GOLDBECK, A. T.
"An Apparatus for Determining Soil Pressures." XVI, Part II, 309 (1916).
Cement mortars. XIII, 821 (1913).
Concrete road aggregates. XVII, Part II, 419 (1917).
Distribution of earth pressures. XVII, Part II, 659 (1917).
"Distribution of Pressures Through Earth Fills." XVII, Part II, 640 (1917).
Modulus of elasticity of concrete. XX, Part II, 261 (1920).
Proportioning mortars. XVIII, Part II, 288 (1918).
Reinforced concrete slabs. XIII, 881, 882 (1913).
Report of Committee C-9 on Concrete and Concrete Aggregates. (Secretary.) XIX, Part I, 318 (1919); XX, Part I, 291 (1920).
"Tests of Reinforced Concrete Slabs under Concentrated Loading." XIII, 858 (1913).
Time of setting of cement. XIV, Part II, 194 (1914).

GOLDMARK, HENRY.
Chain cable. XX, Part II, 102 (1920).

GOODALE, S. L.
"Development of Brinell Hardness Tests on Thin Brass Sheet." XIX, Part II, 757 (1919).

GOODELL, J. M.
Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 273 (1917).
"Memorial Session in Honor of the Memory of Edgar Marburg: Edgar Marburg's Contribution to Engineering." XIX, Part I, 43 (1919).

GORRELL, F. E.
"Topical Discussion on Cooperation in Industrial Research: Cooperative Research in the American Canning Industry." XVIII, Part II, 40 (1918).

GOW, A. C.
Proportioning of concrete aggregates. XV, Part II, 163 (1915).

GRAF, S. H.

"A Universal Strainometer of Simple Design." XV, Part II, 376 (1915).

GREEN, HENRY.

"Further Development of the Plastometer and Its Practical Application to Research and Routine Problems." XX, Part II, 451 (1920).

Mobility of paint. XIX, Part II, 668, 670, 673, 674 (1919).

"Paint, A Plastic Material and not a Viscous Liquid; The Measurement of Its Mobility and Yield Value." XIX, Part II, 640 (1919).

The plastometer and its application. XX, Part II, 484, 491 (1920).

GREEN, H. W.

"Relation Between Methods of Curing Standard Concrete Test Specimens and Their Compressive Strength at 28 Days." XIX, Part II, 607 (1919).

GREENMAN, R. S.

Autoclave tests for cement. XIII, 773 (1913).

Cement. XVII, Part I, 200 (1917).

Concrete failures. XIV, Part II, 337 (1914).

"Examination of Concrete Failures for Their Determining Causes." XIV, Part II, 321 (1914).

Report of Committee C-1 on Cement. (Chairman.) XVII, Part I, 196 (1917); XVIII, Part I, 270 (1918); XIX, Part I, 262 (1919); XX, Part I, 251 (1920).

Specifications for cement. XVI, Part I, 211, 212 (1916).

"Tests of Natural Concrete Aggregates." XIII, 828 (1913).

GREINER, J. E.

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

GRIFFITH, R. E.

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

GRIFFITHS, F. J.

Alloy steels. XVII, Part II, 56 (1917).

"Topical Discussion on the Rôle of the Several Alloying Elements in the Alloy Steels: The Rôle of Chrome Vanadium." XVII, Part II, 33 (1917).

GROESBECK, E. C.

"A Note on Stresses Caused by Cold Rolling." XX, Part II, 31 (1920).

GROWER, G. G.

"Electrolytic Determination of Tin on Tinned Copper Wire." XVII, Part II, 129 (1917).

Tinned copper wire. XVII, Part II, 155 (1917).

H

HALL, A. E.

"The Fusibility of Coal Ash." XV, Part II, 297 (1915).

HALL, C. H.

Hiding power of paints. XX, Part II, 436 (1920).

HALL, J. H.

"Heat Treatment of Hypo-Eutectoid Carbon-Steel Castings." XIII, 514 (1913).

Heat treatment of steel. XIII, 548 (1913).

Report of Committee A-4 on Heat Treatment of Iron and Steel. (Secretary.) XIII, 188 (1913); XIV, Part I, 169 (1914).

HALLETT, R. L.

"An Instrument for Measuring the Hiding Power of Paints." XX, Part II, 426 (1920).

Hiding power of paints. XX, Part II, 436, 437, 439 (1920).

HAMMOND, G. T.

Report of Committee C-4 on Clay and Cement Sewer Pipe. (Secretary.) XVIII, Part I, 274 (1918); XIX, Part I, 305 (1919); XX, Part I, 263 (1920).

HANCE, J. A.

Specifications for non-ferrous railway equipment. XVIII, Part I, 267 (1918).

HANDY, J. O.

Fatigue of copper alloys. XV, Part II, 109 (1915).

HANNA, W. C.

Autoclave tests for cement. XIII, 780 (1913).

Specifications for lime. XV, Part I, 171 (1915).

HARRINGTON, C. O., JR.

Battery zincs. XV, Part II, 116, 117 (1915).

Heating test of asphalts. XVII, Part II, 639 (1917).

Spelter coating on sheets and wire. XV, Part II, 124 (1915).

Test for metallic coatings. XIV, Part II, 479 (1914).

Wrought non-ferrous materials. XIV, Part II, 143 (1914).

HART, L. H.

Powdered admixtures in concrete. XX, Part II, 209 (1920).

HARTSHORNE, W. D.

Report of Committee D-13, Appendix III: "Comparison of Strip and Grab Methods of Testing Textile Fabric for Textile Strength." XVI, Part I, 376 (1916).

Report of Committee D-13 on Textile Materials. (Chairman.) XV, Part I, 440 (1915); XVI, Part I, 360 (1916); XVII, Part I, 497 (1917).

Tests for automobile tire fabrics. XV, Part I, 442 (1915).

Textile materials. XVI, Part I, 386 (1916).

HARVEY, DEAN.

Textile materials. XVI, Part I, 387 (1916).

HASSE, O. C.

Coal ash. XV, Part II, 346 (1915).

Slag concrete. XIV, Part II, 296 (1914).

Time of setting of cement. XIV, Part II, 200 (1914).

HATT, W. K.

"Condensed Report of the Investigation of Reinforcing Bars Rerolled from Steel Rails, conducted under Instructions from Sub-Committee V, of Committee A-1, on Steel Reinforcing Bars." XIII, 96 (1913).

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202, 272, 276, 280 (1917).

Hydration of cement. XIII, 739 (1913).

Reinforced concrete slabs. XIII, 881 (1913).

Specifications for brick. XIV, Part I, 192, 193, 194 (1914).

Steel reinforcement bars. XIII, 174 (1913).

Strain gages. XIII, 1039 (1913).

Testing of rubber goods. XIV, Part II, 637 (1914).

Volume changes in cement. XIV, Part II, 243 (1914).

HAVEN, G. B.

Report of Committee D-13 on Textile Materials. (Chairman.) XVIII, Part I, 357 (1918); XIX, Part I, 400 (1919); XX, Part I, 455 (1920).

Report of Committee D-13, Appendix V: "Effect of Moisture on the Tensile Strength of Aircraft Fabrics." XVIII, Part I, 380 (1918).

HAYS, G. O.

Testing of sand. XIII, 809 (1913).

HECKEL, G. B.

Mobility of paint. XIX, Part II, 671, 673, 675 (1919).

Permeability test of paints. XIV, Part II, 445 (1914).

HECKEL, J. E.

Report of Sub-Committee IX, of Committee D-1: "Reports of Analysts." XVIII, Part I, 307 (1918).

HEMSTREET, G. P.

Report of Committee D-4, Appendix III: Report of Sub-Committee on Softening Point. (Chairman.) XV, Part I, 341 (1915).

Wear tests of paving materials. XVI, Part II, 203 (1916).

HERING, RUDOLPH.

Addendum to Report of Committee C-4. (Chairman.) XVIII, Part I, 280 (1918); XIX, Part I, 306 (1919).

Report of Committee C-4 on Clay and Cement Sewer Pipe. (Chairman.) XIII, 302 (1913); XIV, Part I, 195 (1914); XV, Part I, 163 (1915); XVI, Part I, 220 (1916); XVII, Part I, 293 (1917); XVIII, Part I, 274 (1918); XIX, Part I, 305 (1919); XX, Part I, 263 (1920).

HERSCHEL, W. H.

"A Viscosimeter for Gasoline." XIX, Part II, 676 (1919).

Consistency tester. XVII, Part II, 621 (1917).

"Determination of Absolute Viscosity by the Saybolt Universal and Engler Viscosimeters." XVII, Part II, 551 (1917).

Emulsification of lubricating oils. XVI, Part II, 269, 271, 280 (1916); XX, Part I, 424 (1920).

Heating test of asphalts. XVII, Part II, 635 (1917).

Measurement of viscosity. XVIII, Part II, 384 (1918).

Mobility of paint. XIX, Part II, 667, 668 (1919).

"Quantitative Test for Resistance of Lubricating Oils to Emulsification." XVI, Part II, 248 (1916).

Road materials. XVI, Part I, 316 (1916).

Standard tests for lubricants. XV, Part I, 308, 313 (1915).

The plastometer and its application. XX, Part II, 483 (1920).

"The Standard Saybolt Universal Viscosimeter." XVIII, Part II, 363 (1918).

HESS, HENRY.

Adoption of standards. XIV, Part II, 652 (1914).

Simple overstrain. XIV, Part II, 37, 41 (1914).

Standard methods of testing. XIV, Part I, 397 (1914).

HIBBARD, H. D.

Heat treatment of steel. XIII, 525 (1913).

Rail failures. XIII, 594 (1913).

HICKS, E. F.

Heating test of asphalts. XVII, Part II, 637 (1917).

HILLEBRAND, W. F.

Methods for analysis of cast iron. XV, Part I, 126 (1915).

Report of Sub-Committee II, of the Joint Committee on Coal Analysis, on Moisture. (Chairman.) XIV, Part I, 419 (1914).

Report of Sub-Committee VII, of the Joint Committee on Coal Analysis, on Phosphorus in Ash. XIV, Part I, 434 (1914).

HIRSHFELD, C. F.

Failure of boiler tubes. XVI, Part II, 111, 114 (1916).

HOFAMMANN, K. E.

"Deep Etching of Rails and Forgings." XIX, Part II, 182 (1919).

HOFF, OLAF.

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

HOFFMAN, N. B.

Modern high speed steel. XIX, Part II, 177 (1919).

Specifications for carbon tool steel. XVII, Part I, 124 (1917).

HOLLEY, C. D.

"The Acceptability of Linseed Oil." XVI, Part II, 239 (1916).

HOLLISTER, S. C.

Elasticity of concrete. XIX, Part II, 586 (1919).

HOLMES, A. F.

"An Investigation of the Strength and Elastic Properties of Concrete-Filled Pipe Columns." XV, Part II, 230 (1915).

HOLMES, J. A.

Report of Committee D-5 on Standard Specifications for Coal. (Chairman.) XIII, 458 (1913); XV, Part I, 357 (1915).

Report of Committee D-6 on Standard Specifications for Coke. (Chairman.) XV, Part I, 359 (1915).

HOLTON, E. C.

Report of Sub-Committee IX, of Committee D-1, Appendix: "Reports of Analysts." XVII, Part I, 394, 397, 398, 399, 400, 401 (1917); XVIII, Part I, 307 (1918).

HOLZ, H. A.

Hardness testing. XVIII, Part II, 468, 475 (1918).

Testing of sheet brass. XVII, Part II, 199 (1917).

HOUGH, N. G.

Excess water in concrete. XVII, Part II, 392 (1917).

Report of Committee C-7 on Lime. (Secretary.) XIX, Part I, 310 (1919).

HOWARD, J. E.

Deep etching of rails and forgings. XIX, Part II, 190 (1919).

"On the Shattered Zones in Certain Steel Rails, with Notes on the Interior Origin of Transverse Fissures." XX, Part II, 44 (1920).

Shattered zones in steel rails. XX, Part II, 68 (1920).

Simple overstrain. XIV, Part II, 43 (1914).

"The Relation between Yield Point and Proportional Limit in Various Grades of Steel." XVI, Part II, 403 (1916).

HOWARD, J. W.

Standard specifications for rubber products. XV, Part I, 434 (1915).

HOWE, H. M.

Addresses by Past-Presidents. XVII, Part I, 54 (1917).

A failed axle. XIV, Part II, 86 (1914).

Alloy steels. XVII, Part II, 45, 53, 56 (1917).

Annealing temperatures and grain growth. XVII, Part II, 75 (1917).

"A Note on Stresses Caused by Cold Rolling." XX, Part II, 31 (1920).

"Are the Effects of Simple Overstrain Monotropic?" XIV, Part II, 7 (1914).

Corrosion cracking of brass. XVIII, Part II, 218 (1918).

Failure of boiler tubes. XVI, Part II, 111, 115 (1916).

Hardness of copper wire. XVII, Part II, 122 (1917).

Hardness of steel. XVI, Part II, 51 (1916).

Heat treatment of axles. XVI, Part II, 65, 77 (1916).

Magnetic testing. XVII, Part II, 107 (1917).

"Notes on the Hardening and Tempering of Eutectoid Carbon Steel and on the Shore Test." XVI, Part II, 5 (1916).

Plastic elongation of wire. XVI, Part II, 465 (1916).

Reduction in working brass. XVII, Part II, 163 (1917).

Report on Proceedings of Turin Meeting of the Council of the International Association for Testing Materials. XIV, Part I, 76, 79 (1914).

Simple overstrain. XIV, Part II, 36, 46 (1914).

Specifications for carbon tool steel. XVII, Part I, 128 (1917).

Stresses caused by cold rolling. XX, Part II, 42 (1920).

"Topical Discussion on the Rôle of the Several Alloying Elements in the Alloy Steels: The Rôle of Manganese." XVII, Part II, 5 (1917).

"Topical Discussion on Cooperation in Industrial Research: General Introduction." XVIII, Part II, 8 (1918).

HOWE, R. M.

Refractory bricks. XVIII, Part II, 346 (1918); XIX, Part II, 632 (1919).

Report of Committee C-8, Appendix: "Vital Factors in the Testing of Fire-Clay Refractories and in the Interpretation of Results." XX, Part I, 278 (1920).

HOWES, B. A.

Specifications for cement. XVI, Part I, 203 (1916).

HUBBARD, PRÉVOST.

"A New Consistency Tester for Viscous Liquid Bituminous Materials." XVII, Part II, 603 (1917).

Asphalt content of road oils. XX, Part II, 321 (1920).

Consistency tester. XVII, Part II, 625 (1917).

Heating test of asphalts. XVII, Part II, 638 (1917).

Nomenclature of road materials. XIII, 454 (1913).

Petroleum residuals. XX, Part II, 313 (1920).

Report of Committee D-4, Appendix I: Report of Special Joint Committee Appointed to Consider Definitions of Road Materials. (Chairman.) XV, Part I, 332 (1915).

Report of Committee D-4 on Road Materials. (Secretary.) XIII, 448 (1913); XIV, Part I, 374 (1914); XV, Part I, 325 (1915); XVI, Part I, 300 (1916); XVII, Part I, 470 (1917); XVIII, Part I, 326 (1918); XIX, Part I, 392 (1919); XX, Part I, 428 (1920).

"The Specific Gravity of Non-Homogeneous Aggregates." XVI, Part II, 378 (1916).

HUGHES, E. E.

Adoption of standards. XIV, Part II, 658 (1914).

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

HULL, F. A.

"Method for Studying the Effects of Temperature upon the Physical Condition of Asphalts, Waxes, etc." XVII, Part II, 627 (1917).

HULL, W. A.

"Comparison of Heat-Insulating Properties of Materials Used in Fire-Resistive Construction." XVII, Part II, 422 (1917).

Fireproofing. XVII, Part I, 307 (1917).

Heat-insulating materials. XVII, Part II, 444, 450 (1917).

HUMPHREY, RICHARD L.

Concrete failures. XIV, Part II, 336 (1914).

Final Report of the Joint Committee on Concrete and Reinforced Concrete. (Secretary.) XVII, Part I, 202, 263, 270, 271, 275, 277 (1917).

Joint conference on specifications for cement. XV, Part I, 149 (1915).

Report of Committee C-1, Appendix: Report of Sub-Committee on Accelerated Tests of Cement. (Chairman.) XV, Part I, 147 (1915).

Report of Committee C-1 on Cement. (Secretary.) XIII, 221 (1913); XIV, Part I, 183 (1914); XV, Part I, 144 (1915); XVI, Part I, 200 (1916).

Report of Committee C-2 on Reinforced Concrete. (Secretary.) XIII, 223 (1913); XVII, Part I, 201 (1917); XVIII, Part I, 273 (1918); (Chairman.) XIX, Part I, 264 (1919); XX, Part I, 253 (1920).

Report of Committee E-5, Appendix: Statement of Sub-Committee on Classification of Standing Committees and Standards. (Chairman.) XVII, Part I, 519 (1917).

Slag concrete. XIV, Part II, 294 (1914).

Specifications for cement. XVI, Part I, 206, 210 (1916).

Specifications for lime. XIII, 320, 323, 328 (1913).

Time of setting of cement. XIV, Part II, 199 (1914).

Volume changes in cement. XIV, Part II, 243 (1914).

HUNNINGS, S. V.

"A New Vibratory Testing Machine and Results Obtained by Its Use." XIV, Part II, 548 (1914).

Heat treatment of steel. XV, Part II, 39 (1915).

Non-ferrous metals. XVI, Part I, 195, 197 (1916).

Report of Committee A-2 on Wrought Iron. (Chairman.) XIII, 183 (1913); XIV, Part I, 144 (1914); XV, Part I, 121 (1915); XVI, Part I, 147 (1916); XVII, Part I, 130 (1917).

Report of Committee E-1 on Methods of Testing. (Secretary.) XIX, Part I, 411 (1919).

Standard specifications for cast iron. XIV, Part I, 166 (1914).

Standard specifications for steel. XIV, Part I, 137, 138 (1914).

Standard methods of testing. XIV, Part I, 404 (1914).

HUNT, R. W.

Addresses by Past-Presidents. XVII, Part I, 52 (1917).

Adoption of standards. XIV, Part II, 653, 655 (1914).

A failed axle. XIV, Part II, 84 (1914).

Annual Report of the Executive Committee. (President.) XIII, 38 (1913).

Corrosion of metals. XIII, 627 (1913).

"Memorial Session in Honor of the Memory of Edgar Marburg: Edgar Marburg, A Personal Tribute." XIX, Part I, 55 (1919).

Shipping containers. XIII, 1099, 1103 (1913).

Specifications for brick. XIII, 301 (1913).

Specifications for lime. XIII, 326 (1913).

HUNT, R. W. (*Continued*).
Specifications for steel tie plates. XVII, Part I, 121, 122, 123 (1917).
Standard specifications for steel. XIV, Part I, 132, 133, 134 (1914).
"The Application of Specifications." (Annual Address by the President.) XIII, 32 (1913).

HUTCHINSON, G. W.
Powdered admixtures in concrete. XX, Part II, 207, 208 (1920).

I

INGALLS, E.
Report of Sub-Committee IX, of Committee D-1, Appendix: Reports of Analysts. XVII, Part I, 390 (1917).

INGALLS, F. P.
Mobility of paint. XIX, Part II, 670 (1919).
Report of Sub-Committee IX, of Committee D-1, Appendix: "Reports of Analysts." XVII, Part I, 393, 394, 395, 397, 398, 399, 400, 401 (1917).

INGBERG, S. H.
Fireproofing. XVII, Part I, 308 (1917).

J

JACKMAN, DEAN M.
Report of Sub-Committee E, of Committee D-1: "Report of Analyst 1." XIII, 381 (1913).

JACKSON, F. H., JR.
"Effect of Controllable Variables on the Toughness Test for Rock." XVII, Part II, 571 (1917).
Specific gravity of aggregates. XVI, Part II, 402 (1916).
"The Specific Gravity of Non-Homogeneous Aggregates." XVI, Part II, 378 (1916).
"The Standard Deval Abrasion Test for Rock." XX, Part II, 278 (1920).
Toughness test for rock. XVII, Part II, 588 (1917).

JEFFERS, J. M.
Report of Committee D-2 on Standard Tests for Lubricants. (Secretary.) XIV, Part I, 356 (1914).

JEFFRIES, ZAY.
Annealing temperatures and grain growth. XVII, Part II, 79 (1917).
Grain size of iron. XVIII, Part II, 82 (1918).

JELLEME, W. O.
Report of Committee D-13:
Appendix I: "Variables Affecting the Indicated Breaking Strength of Cotton Fabrics." XX, Part I, 456 (1920).
Appendix II: "Machine Rate of Load as Affecting Breaking Strength Shown by Fabric Testing Machines." XX, Part I, 460 (1920).
Appendix III: "Effect of Jaws on Fabric Strength." XX, Part I, 469 (1920).

JOB, ROBERT.
A failed axle. XIV, Part II, 89 (1914).
"A Failed Axle: Study of an Internal Transverse Fissure." XIV, Part II, 76 (1914).
Battery zincs. XV, Part II, 116, 117, 118 (1915).
"Battery Zincs: Some Causes of Defective Service." XV, Part II, 112 (1915).

JOB, ROBERT (*Continued*).
Deep etching of rails and forgings. XIX, Part II, 202 (1919).
Heating test of asphalts. XVII, Part II, 637 (1917).
Heat treatment of steel. XIII, 529 (1913).
Mobility of paint. XIX, Part II, 672 (1919).
Rail failures. XIII, 597 (1913).
Shattered zones in steel rails. XX, Part II, 65 (1920).
Specifications for boiler steel for locomotives. XVIII, Part I, 139 (1918).
Specifications for steel forging blooms. XIII, 181 (1913).

JOHNSON, A. L.
Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).
Specifications for steel reinforcement bars. XIII, 169 (1913).

JOHNSON, A. M.
Concrete failures. XIV, Part II, 335 (1914).

JOHNSON, A. N.
Excess water in concrete. XVII, Part II, 385, 386, 391, 392 (1917).
"Tests of Concrete Slabs to Determine the Effect of Removing Excess Water Used in Mixing." XVII, Part II, 378 (1917).

JOHNSON, J. E., JR.
Chilled cast iron. XIV, Part II, 123, 126 (1914).
Standard specifications for cast iron. XIV, Part I, 166, 168 (1914).

JOHNSON, N. C.
Concrete failures. XIV, Part II, 332, 335 (1914).
Excess water in concrete. XVII, Part II, 387, 390 (1917).
Microstructure of concretes. XV, Part II, 215, 218, 220, 224, 227 (1915).
Proportioning mortars. XVIII, Part II, 284 (1918).
Strength of concrete. XVII, Part II, 359 (1917).
Testing concrete aggregates. XIV, Part II, 304 (1914).
"The Microstructure of Concretes." XV, Part II, 171 (1915).
Time of setting of cement. XIV, Part II, 194 (1914).
Volume changes in cement. XIV, Part II, 242 (1914).

JOHNSON, W. E.
Minority Report of Committee A-1 on Standard Specifications for Steel. XIV, Part I, 128 (1914).
Standard specifications for steel. XIV, Part I, 132, 133, 134, 136, 137 (1914).

JOHNSTON, JOHN.
"Topical Discussion on Cooperation in Industrial Research: Recent Developments in Great Britain." XVIII, Part II, 12 (1918).

JONES, J. L.
"A New Method for Calibrating Brinell Hardness Testing Machines." XX, Part II, 392 (1920).
Battery zincs. XV, Part II, 117 (1915).
Non-ferrous metals. XVI, Part I, 197 (1916).
"Molten Zinc as a Reagent for the Macroscopic Etching of Iron and Steel." XV, Part II, 89 (1915).
Report of Sub-Committee III, of Committee B-2, on Sand-Cast Metals and Alloys. XVII, Part I, 187, 191, 194 (1917).
Spelter coating on sheets and wire. XV, Part II, 124 (1915).
"Sumner Elastic-Limit Recorder." XVIII, Part II, 478 (1918).

JONSON, ERNST.

Corrosion cracking of brass. XVIII, Part II, 201 (1918).

"Fatigue of Copper Alloys." XV, Part II, 101 (1915).

Fatigue of copper alloys. XV, Part II, 109, 111 (1915).

"Inspection of Brass and Bronze." XVII, Part II, 212 (1917).

JURY, A. E.

Report of Committee D-13, Appendix III: "Effect of Jaws on Fabric Strength." XX, Part I, 469 (1920).

K

KARR, C. P.

Cast zinc. XIII, 698 (1913).

Corrosion of metals. XIII, 626 (1913).

Non-ferrous alloys. XIII, 668 (1913).

"Some Tests of Light Aluminum Casting Alloys: The Effect of Heat Treatment." XIX, Part II, 297 (1919).

KELLEY, G. L.

Modern high speed steel. XIX, Part II, 157 (1919).

KELLOGG, J. W.

Report of Sub-Committee III, of Committee D-1, Appendix: "Reports of Analysts on Lumbang and Perilla Oils." XVII, Part I, 369 (1917).

KENNEY, E. F.

Finishing temperatures of rails. XV, Part I, 119 (1915).

Heat treatment of steel. XIII, 533 (1913).

Report of Committee A-1, Appendix I: Report on Finishing Temperatures of Rails. (Chairman.) XV, Part I, 91 (1915).

Specifications for steel splice bars. XIII, 175 (1913).

KENNEY, L. H.

Modern high speed steel. XIX, Part II, 174 (1919).

KERSHAW, W. H.

Waterproofing. XIII, 961 (1913).

KINNEY, W. M.

Compressive strength of concrete. XVII, Part II, 376 (1917).

Excess water in concrete. XVII, Part II, 386, 393 (1917).

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 273, 279 (1917).

Proportioning concrete aggregates. XIV, Part II, 271 (1914).

Specifications for cement. XVI, Part I, 213 (1916).

KITTS, J. A.

"Economical Proportions for Portland-Cement Mortars and Concretes." XVII, Part II, 279 (1917).

Proportioning of concrete. XVII, Part II, 299 (1917).

Proportioning of concrete aggregates. XV, Part II, 165 (1915).

Specifications for cement. XVI, Part I, 206 (1916).

"Weight-Volumetric Proportioning of Concrete Aggregates in Testing." XV, Part II, 153 (1915).

KOHR, D. A.

Permeability test of paints. XIV, Part II, 426 (1914).

Report of Sub-Committee V, of Committee D-1, Appendix: Comments of Analysts. XV, Part I, 236 (1915).

KOUWENHOVEN, W. B.

"Topical Discussion on Magnetic Analysis: Location of Flaws in Rifle Barrel Steel by Magnetic Analysis." XIX, Part II, 80 (1919).

L

LANGMUIR, A. C.

Report of Sub-Committee XIII, of Committee D-1, on Shellac. (Chairman.) XV, Part I, 266 (1915); XVI, Part I, 292 (1916).

LANZA, GAETANO.

Elastic limit. XV, Part II, 432 (1915).

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

Report of Committee E-1 on Methods of Testing. (Chairman.) XIII, 469 (1913); XIV, Part I, 391 (1914); XV, Part I, 443 (1915); XVI, Part I, 390 (1916); XVII, Part I, 499 (1917); XVIII, Part I, 399 (1918); XIX, Part I, 411 (1919).

Standard methods of testing. XIV, Part I, 404, 406, 407, 408 (1914); XV, Part I, 450 (1915).

Tests of heat-treated spring steel. XIII, 561 (1913).

LARNED, E. S.

Microstructure of concretes. XV, Part II, 215 (1915).

Road-building rocks. XIII, 995 (1913).

LASIER, E. L.

Bronze corrosion tests. XIX, Part II, 289 (1919).

Cast steel chain. XVIII, Part II, 143 (1918).

Color of pigments. XVII, Part II, 528 (1917).

Corrosion of steel. XIX, Part II, 241 (1919).

Hardness testing. XVIII, Part II, 471 (1918).

Inspection of brass and bronze. XVII, Part II, 225, 232 (1917).

"Large-Capacity Testing Machines in United States and England." XIII, 996 (1913).

Nomenclature of non-ferrous alloys. XX, Part I, 245 (1920).

"Results of Tests of Welded Boiler Tubes." XIII, 606 (1913).

Specific gravity of aggregates. XVI, Part II, 402 (1916).

Splices in reinforcement bars. XVI, Part II, 235 (1916).

Stress-strain diagrams. XVII, Part II, 596 (1917).

"The Strength of Clamped Splices in Concrete Reinforcement Bars." XVI, Part II, 209 (1916).

LAW, L. M.

Report of Committee D-4, Appendix: Report of Sub-Committee on Penetration of Bituminous Materials. (Chairman.) XVI, Part I, 306 (1916).

Report of Committee D-4, Appendix V: Report of Sub-Committee on Penetration. (Chairman.) XV, Part I, 352 (1915).

Report of Committee D-8 on Waterproofing. (Secretary.) XVII, Part I, 487 (1917); XVIII, Part I, 347 (1918).

LEECH, J. O.

Specifications for steel wheels. XIII, 179 (1913).

Specifications for steel forging blooms. XIII, 181 (1913).

LEEDS, M. E.

Heat treatment of steel. XV, Part II, 26 (1915).

"Some Neglected Phenomena in the Heat Treatment of Steel." XV, Part II, 5 (1915).

LESH, I. B.

Chilled cast iron. XIV, Part II, 122, 124 (1914).

Methods for analysis of cast iron. XV, Part I, 129 (1915).

LESLEY, R. W.

Compressive strength of concrete. XVII, Part II, 376 (1917).

Concrete failures. XIV, Part II, 330 (1914).

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

Hydration of cement. XIII, 739 (1913).

"Memorial Session in Honor of the Memory of Edgar Marburg: Edgar Marburg —His Early Activities in the Society." XIX, Part I, 47 (1919).

Microstructure of concretes. XV, Part II, 214 (1915).

Proportioning mortars. XVIII, Part II, 288 (1918).

Quick-hardening cements. XIX, Part II, 439 (1919).

LEVY, A. G.

"Notes on the Hardening and Tempering of Eutectoid Carbon Steel and on the Shore Test." XVI, Part II, 5 (1916).

LEWIS, W. S.

Report of Committee D-13, Appendix II: "Comparison of Strip and Grab Methods of Testing Textile Fabric for Tensile Strength." XVI, Part I, 366 (1916).

LIBBERTON, J. H.

Concrete aggregate for highways. XX, Part II, 277 (1920).

LICHTNER, W. O.

"A Simple Compression Machine for Testing Structural Materials." XIV, Part II, 535 (1914).

LIND, JOHN.

Report of Committee D-13, Appendix V: "Effect of Unbroken Warp Threads on Tensile Strength of Textile Fabric." XVI, Part I, 383 (1916).

LINDAU, A. E.

Specifications for steel reinforcement bars. XIII, 173 (1913).

LINDER, OSCAR.

Battery zincs. XV, Part II, 117 (1915).

"Specifications and Tests of Glue." XIV, Part II, 508 (1914).

LINDSAY, C. F.

Inspection of brass and bronze. XVII, Part II, 232 (1917).

LINDSAY, R. W.

Permeability test of paints. XIV, Part II, 446 (1914).

Report of Sub-Committee III, of Committee D-1, Appendix: "Reports of Analysts on Lumbang and Perilla Oils." XVII, Part I, 371 (1917).

Report of Sub-Committee III, of Committee D-1, Appendix: "Reports of Analysts on Perilla Oil." XVI, Part I, 282 (1916).

Report of Sub-Committee IX, of Committee D-1, Appendix: "Reports of Analysts." XVII, Part I, 394, 399, 400, 401 (1917).

LITCHFIELD, NORMAN.

Minority Report of Committee A-1 on Standard Specifications for Steel. XIV, Part I, 128 (1914).

Specifications for copper wire. XIII, 205 (1913).

Specifications for steel splice bars. XIII, 174 (1913).

Specifications for steel wheels. XIII, 176, 177 (1913).

LITTLE, A. D.

"Topical Discussion on Cooperation in Industrial Research: Organization of Industrial Research." XVIII, Part II, 22 (1918).

LLOYD, H. E.

"Apparatus for Determination of Breaking Point of Pitches." XIX, Part II, 782 (1919).

LONG, W. F.

Specifications for concrete aggregates. XVI, Part II, 190 (1916).

LUTTS, C. G.

"Chain Cable and Some of its Physical Properties." XX, Part II, 80 (1920).

LYNCH, T. D.

Bearing metals. XIII, 712, 713 (1913).

"Elastic Limit." XV, Part II, 415 (1915).

Elastic limit. XV, Part II, 436 (1915).

Inspection of brass and bronze. XVII, Part II, 237 (1917).

Non-ferrous castings. XIV, Part II, 161 (1914).

Standard methods of testing. XIV, Part I, 399 (1914); XV, Part I, 450 (1915).

"Study of Bearing Metals and Methods of Testing." XIII, 699 (1913).

"The Relation between Yield Point and Proportional Limit in Various Grades of Steel." XVI, Part II, 413 (1916).

"Wire Testing Extensometer." XIX, Part II, 695 (1919).

Wire testing extensometer. XIX, Part II, 707 (1919).

Wrought non-ferrous materials. XIV, Part II, 141 (1914).

Yield point and proportional limit. XVI, Part II, 447 (1916).

M

MACFARLAND, H. B.

Standard specifications for steel. XIV, Part I, 135 (1914).

MACGREGOR, J. S.

Non-ferrous castings. XIV, Part II, 160 (1914).

Report of Committee C-7 on Lime. (Chairman.) XIV, Part I, 213 (1914); XV, Part I, 167 (1915); XVII, Part I, 312 (1917).

Simple overstrain. XIV, Part II, 41 (1914).

Specifications for lime. XIV, Part I, 220 (1914); XV, Part I, 172 (1915).

Toughness test for rock. XVII, Part II, 587 (1917).

MACKENZIE, K. G.

Emulsification of lubricating oils. XVI, Part II, 280 (1916).

Report of Committee D-2 on Lubricants. (Secretary.) XV, Part I, 273 (1915); XVII, Part I, 462 (1917); XVIII, Part I, 321 (1918); XIX, Part I, 388 (1919); XX, Part I, 406 (1920).

Report of Committee D-4, Appendix I: Report of Special Joint Committee Appointed to Consider Definitions of Road Materials. XV, Part I, 334 (1915).

Standard tests for lubricants. XIV, Part I, 372 (1914); XV, Part I, 304, 310, 312, 323 (1915).

Viscosity of lubricants. XIX, Part I, 389 (1919).

MACPHERRAN, R. S.

Bearing metals. XIII, 712 (1913).

Chilled cast iron. XIV, Part II, 124 (1914).

Elastic limit. XV, Part II, 435 (1915).

Heat treatment of steel. XIII, 542 (1913).

MACPHERRAN, R. S. *(Continued).*

Magnetic testing. XVII, Part II, 107 (1917).

Methods for analysis of cast iron. XV, Part I, 126, 127, 128 (1915).

Non-ferrous alloys. XIII, 667 (1913).

Specifications for steel forging blooms. XIII, 181 (1913).

MALYSHEFF, A. P.

Yield point and proportional limit. XVI, Part II, 448 (1916).

MANEY, G. A.

"Relation between Deformation and Deflection in Reinforced-Concrete Beams." XIV, Part II, 310 (1914).

MARANI, V. G.

Report of Committee C-11 on Gypsum. (Secretary.) XIX, Part I, 325 (1919); XX, Part I, 380 (1920).

MARBURG, EDGAR.

"A Critical Review of the Procedure Governing the Adoption of Standards." XIV, Part II, 639 (1914).

Adoption of standards. XIV, Part II, 650, 651, 655, 659 (1914).

Annual Report of the Executive Committee. (Secretary-Treasurer.) XIII, 38 (1913); XIV, Part I, 39 (1914); XV, Part I, 42 (1915); XVI, Part I, 45 (1916); XVII, Part I, 56 (1917); XVIII, Part I, 59 (1918).

Autoclave tests for cement. XIII, 779 (1913).

Preservative coatings for structural materials. XIV, Part I, 355 (1914).

Pressures on walls and bins. XV, Part II, 395 (1915).

Repeated stress. XV, Part II, 465 (1915).

Report of Committee A-1 on Standard Specifications for Steel. (Secretary.) XIII, 58 (1913).

Report of Committee E-5 on Regulations Governing the Form but not the Substance of Specifications. (Chairman.) XIII, 470 (1913); XIV, Part I, 456 (1914).

Report of Committee E-5 on Standing Committees. (Chairman.) XV, Part I, 456 (1915); XVI, Part I, 393 (1916); XVIII, Part I, 428 (1918).

Report of Committee E-6 on Papers and Publications. (Chairman.) XIII, 472 (1913); XIV, Part I, 463 (1914); XV, Part I, 466 (1915); XVI, Part I, 404 (1916); XVII, Part I, 529 (1917); XVIII, Part I, 440 (1918).

Shipping containers. XIII, 1100 (1913).

Specifications for cement. XVI, Part I, 212, 213 (1916).

Specifications for rubber products. XIV, Part I, 388, 389 (1914).

Specifications for steel wheels. XIII, 178 (1913).

Standard methods of testing. XIV, Part I, 405, 407 (1914).

Standard specifications for brick. XIV, Part I, 193 (1914).

Standard specifications for gypsum. XV, Part I, 182, 183, 184 (1915).

Standard tests for lubricants. XIV, Part I, 370, 371, 372, 373 (1914); XV, Part I, 316, 317 (1915).

Strain gages. XIII, 1041 (1913).

Testing of rubber goods. XIV, Part II, 637 (1914).

"Topical Discussion on Cooperation in Industrial Research: Opening Announcement." XVIII, Part II, 5 (1918).

MARSHALL, C. H.

"A New Method for Calibrating Brinell Hardness Testing Machines." XX, Part II, 392 (1920).

"Improved Elastic Limit Recorder." XX, Part II, 361 (1920).

"Sumner Elastic-Limit Recorder." XVIII, Part II, 478 (1918).

MARSTON, ANSON.

Drain tile. XVI, Part I, 262 (1916).

Failure of a tile drain. XVII, Part II, 465 (1917).

Reinforced concrete slabs. XIII, 882 (1913).

Report of Committee C-6 on Drain Tile. (Chairman.) XIII, 303 (1913); XIV, Part I, 208 (1914); XV, Part I, 165 (1915); XVI, Part I, 259 (1916); XVII, Part I, 311 (1917); XIX, Part I, 308 (1919); XX, Part I, 268 (1920)

MARTIN, E. W.

Report of Sub-Committee E, of Committee D-1: "Report of Analyst 7." XIII, 391 (1913).

Report of Sub-Committee V of Committee D-1, Appendix: "Comments of Analysts." XV, Part I, 234 (1915); "Reports of Analysts." XVII, Part I, 379 (1917).

MATHEWS, J. A.

Heat treatment of steel. XIII, 544 (1913).

"Magnetic Habits of Alloy Steels." XIV, Part II, 50 (1914).

Magnetic habits of alloy steels. XIV, Part II, 69, 70 (1914).

Magnification scales for micrographs. XVII, Part I, 510 (1917).

"Modern High Speed Steel." XIX, Part II, 141 (1919).

Modern high speed steel. XIX, Part II, 180 (1919).

MATHEWSON, C. H.

Corrosion cracking of brass. XVIII, Part II, 211 (1918).

MATTIMORE, H. S.

Abrasion test for road materials. XVIII, Part II, 426 (1918).

Concrete aggregate for highways. XX, Part II, 277 (1920).

Concrete failures. XIV, Part II, 329, 337 (1914).

Concrete road aggregates. XVII, Part II, 417 (1917).

Excess water in concrete. XVII, Part II, 385 (1917).

Finer grinding of portland cement. XV, Part II, 150 (1915).

"Impact Test on Concrete to Regulate Coarse and Fine Aggregate Qualities and Mixes for Highways." XX, Part II, 266 (1920).

Sampling of road material. XVIII, Part II, 414 (1918).

Wear tests of paving materials. XVI, Part II, 206 (1916).

McADAM, D. J., JR.

"A High-Speed Alternating Torsion Testing Machine." XX, Part II, 366 (1920).

Aluminum bronze. XVI, Part II, 148 (1916).

"An Alternating Torsion Testing Machine." XVII, Part II, 599 (1917).

"Annealing Temperatures and Grain Growth." XVII, Part II, 58 (1917).

Annealing temperatures and grain growth. XVII, Part II, 83 (1917).

Endurance and impact tests. XVI, Part II, 308 (1916).

"Endurance and Impact Tests of Metals." XVI, Part II, 292 (1916).

Grain size of iron. XVIII, Part II, 85 (1918).

"Grain Size of Iron as Affected by Temperature." XVIII, Part II, 68 (1918).

McDONNELL, M. E.

Standard tests for lubricants. XV, Part I, 307 (1915).

McILHINEY, P. C.

Paint protection for portland cement surfaces. XIV, Part II, 493 (1914).

Preservative coatings for structural materials. XIV, Part I, 354 (1914).

Standard tests for lubricants. XIV, Part I, 373 (1914); XV, Part I, 314 (1915).

McKINLEY, J. M.
Refractory brick. XVIII, Part II, 349 (1918).

McNAUGHTON, J. P.
Permeability test of paints. XIV, Part II, 444 (1914).

McNAUGHTON, M.
"Outline of a Test for Indicating the Relative Priming and Top-Coat Values of Different Paints." XIII, 947 (1913).

MEADE, R. K.
"Action of Various Substances on Cement Mortars." XIII, 813 (1913).
Cement mortars. XIII, 822 (1913).

MERICA, P. D.
Fatigue of copper alloys. XV, Part II, 109 (1915).
Fatigue tests of aluminum alloys. XX, Part II, 133 (1920).
"Some Tests of Light Aluminum Casting Alloys: The Effect of Heat Treatment." XIX, Part II, 297 (1919).
"The Behavior of Wrought Manganese Bronze Exposed to Corrosion while under Tensile Stress." XIX, Part II, 278 (1919).
Tinned copper wire. XVII, Part II, 153 (1917).
"Topical Discussion on Season and Corrosion Cracking of Brass: Initial Stress and Corrosion Cracking." XVIII, Part II, 165 (1918).

MERRILL, ALDEN.
Report of Committee B-2, Appendix: Determination of Manganese in Manganese Bronze. XVIII, Part I, 256 (1918).

MERRILL, W. L.
Cast steel chain. XVIII, Part II, 114 (1918).

MERRIMAN, MANSFIELD.
Addresses by Past-Presidents. XVII, Part I, 55 (1917).
Annual Report of the Executive Committee. (President.) XVI, Part I, 45 (1916).
Fatigue of copper alloys. XV, Part II, 109 (1915).
Non-ferrous metals. XVI, Part I, 197 (1916).
"The Work of Committees." (Annual Address by the President.) XVI, Part I, 34 (1916).
Yield point and proportional limit. XVI, Part II, 442 (1916).

MERWIN, H. E.
Color of pigments. XVII, Part II, 527, 529 (1917).
"Optical Properties and Theory of Color of Pigments and Paints." XVII, Part II, 494 (1917).

MILLER, C. P.
Notched bar impact tests. XIX, Part II, 756 (1919).

MILLER, J. G.
"Methods for Determining the Melting Points of Asphalts." XIV, Part II, 502 (1914).

MILLER, R. P.
Adoption of standards. XIV, Part II, 650, 652 (1914).
Report of Committee C-5 on Fireproofing. (Secretary.) XVII, Part I, 295 (1917); XVIII, Part I, 281 (1918).
Report of Committee C-5 on Fireproofing Materials. (Secretary.) XIV, Part I, 206 (1914)

MILLS, C. B.

Report of Sub-Committee III, of Committee D-1, Appendix: "Reports of Analysts on Perilla Oil." XVI, Part I, 280 (1916). Appendix: "Reports of Analysts on Lumbang and Perilla Oils." XVII, Part I, 371 (1917).

Report of Sub-Committee V, of Committee D-1, Appendix: "Reports of Analysts." XVII, Part I, 378 (1917).

Report of Sub-Committee IX, of Committee D-1, Appendix: "Reports of Analysts." XVII, Part I, 394, 397, 398, 399, 400, 401 (1917).

Report of Sub-Committee E, of Committee D-1: "Report of Analyst 5." XIII, 387 (1913).

MOISSEIFF, L. S.

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

MOLDENKE, RICHARD.

Adoption of standards. XIV, Part II, 659 (1914).

Chilled cast iron. XIV, Part II, 126 (1914).

Coal ash. XV, Part II, 344 (1915).

International standard specifications. XVI, Part II, 488 (1916).

Methods for analysis of cast iron. XV, Part I, 129 (1915).

Report of Committee A-3 on Cast Iron. (Chairman.) XVII, Part I, 133 (1917); XVIII, Part I, 156 (1918).

Report of Committee A-3, Appendix I: Progress Report of the American Members of International Committee 1 (*b*) on Specifications for Cast Iron. XIV, Part I, 149 (1914).

Report of Committee A-3 on Cast Iron and Finished Castings. (Chairman.) XIV, Part I, 147 (1914); XV, Part I, 123 (1915); XVI, Part I, 150 (1916).

Report of Committee D-6 on Coke. (Chairman.) XVI, Part I, 325 (1916); XVIII, Part I, 335 (1918); XX, Part I, 445 (1920).

Specifications for steel tie plates. XVII, Part I, 122 (1917).

Standard specifications for cast iron. XIV, Part I, 164, 165, 167, 168 (1914).

Turin Meeting of the Council of the International Association for Testing Materials. XIV, Part I, 79 (1914).

MONTGOMERY, R. J.

"Silica Cement." XVIII, Part II, 350 (1918).

MOORE, E. J.

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

MOORE, H. F.

Alternating torsion testing machine. XX, Part II, 371 (1920).

Aluminum bronze. XVI, Part II, 146, 148, 149 (1916).

Axial strainometers. XIV, Part II, 531 (1914).

"Constants and Diagrams for Repeated-Stress Calculations." XVI, Part II, 470 (1916).

Delicate flexure tests. XX, Part II, 387 (1920).

Elastic limit. XV, Part II, 432, 434 (1915).

Fatigue testing machine. XIX, Part II, 717 (1919).

Fatigue tests of steel. XIX, Part II, 220 (1919).

"Rapid Semi-Autographic Tests for Determining the Proportional Limit." XVII, Part II, 589 (1917).

Repeated stress. XV, Part II, 465, 466 (1915).

Report of Committee E-1, Appendix: Report of Sub-Committee on Effect of Form and Size of Test Piece. (Chairman.) XVII, Part I, 502 (1917).

MOORE, H. F. (*Continued*).

Report of Committee E-1, Appendix II: "Tension Tests of Steel with Test Specimens of Various Size and Form." XVIII, Part I, 403 (1918).

"Some Fatigue Tests of Nickel Steel and Chrome-Nickel Steel." XIX, Part II, 206 (1919).

Standard methods of testing. XIV, Part I, 403 (1914).

Stress-strain diagrams. XVII, Part II, 598 (1917).

"The Failure of Materials under Repeated Stress." XV, Part II, 437 (1915).

"The Relation between Yield Point and Proportional Limit in Various Grades of Steel." XVI, Part II, 426 (1916).

"Use of the Strain Gage in the Testing of Materials." XIII, 1019 (1913).

Wire testing extensometer. XIX, Part II, 708 (1919).

Yield point and proportional limit. XVI, Part II, 440, 441 (1916).

MORRIS, C. T.

Reinforced concrete slabs. XIII, 882 (1913).

MORSE, H. L.

"An Apparatus for Testing the Standard Cast-Iron Arbitration Bar." XVI, Part II, 282 (1916).

Yield point and proportional limit. XVI, Part II, 434 (1916).

MOYER, ALBERT.

"Proportioning Aggregates for Portland-Cement Concrete." XIV, Part II, 255 (1914).

Proportioning concrete aggregates. XIV, Part II, 275, 276, 277 (1914).

MUCKENFUSS, A. M.

Permeability test of paints. XIV, Part II, 440, 444, 450 (1914).

"Report on a Permeability Test for Paints and Varnishes." XIV, Part II, 359 (1914).

MUER, H. F.

Specific gravity of sand. XV, Part I, 356 (1915).

Standard specifications for rubber products. XV, Part I, 437 (1915).

Standard tests for lubricants. XV, Part I, 295 (1915).

Test for distillation of paint thinners other than turpentine. XV, Part I, 272 (1915).

N

NASH, J. P.

Concrete road aggregates. XVII, Part II, 421 (1917).

"Tests of Concrete Road Aggregates." XVII, Part II, 394 (1917).

NEAD, J. H.

"Effect of Size of Section on Physical Properties Developed by Heat Treatment." XIII, 489 (1913).

Heat treatment of steel. XIII, 527, 532 (1913).

NEALE, L. I.

Report of Committee C-11 on Gypsum and Gypsum Products. (Secretary.) XV, Part I, 179 (1915); XVI, Part I, 268 (1916).

NELLIS, J. C.

Shipping containers. XVIII, Part I, 351, 352 (1918).

NEMZEK, L. P.

Report of Sub-Committee III, of Committee D-1: Appendix: "Reports of Analysts on Perilla Oil." XVI, Part I, 280 (1916). Appendix: "Reports of Analysts on Lumbang and Perilla Oils." XVII, Part I, 370 (1917).

Report of Sub-Committee IX, of Committee D-1. Appendix: "Reports of Analysts." XVII, Part I, 392, 393, 394, 398, 399, 400, 401 (1917); XVIII, Part I, 306 (1918).

Report of Sub-Committee XVI, of Committee D-1, on Terms Used in Reporting the Surface Condition of Painted Surfaces. (Chairman.) XIX, Part I, 384 (1919).

NESBITT, C. E.

"Practical Methods for Testing Refractory Fire Brick." XVI, Part II, 349 (1916).

"Preventable Defects in Refractory Bricks." XIX, Part II, 619 (1919).

Refractory bricks. XIX, Part II, 635, 638 (1919).

Refractory fire brick. XVI, Part II, 376 (1916).

Report of Committee C-8 on Refractories, Appendix: "Slag Test for Refractory Brick Used in the Iron and Steel Industry." XVII, Part I, 314 (1917).

"Suggested Improvements in the Manufacture of Silica Brick." XVII, Part II, 467 (1917).

"The Necessity for Inspection and Testing of Refractory Brick." XVIII, Part II, 336 (1918).

NEWBERRY, S. B.

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

High-silica portland cement. XVII, Part II, 254 (1917).

NEWLIN, J. A.

Report of Committee D-7, Appendix I: "The Need of a Quality Classification for Douglas Fir." XVI, Part I, 340 (1916).

Report of Committee D-7 on Timber. (Secretary.) XX, Part I, 446 (1920).

Report of Committee D-10 on Shipping Containers. (Chairman.) XIX, Part I, 395 (1919); XX, Part I, 449 (1920).

"The Development of a Box-Testing Machine and Some Results of Tests." XVI, Part II, 320 (1916).

NIEDNER, L. C.

Reinforcing bars. XIV, Part II, 107 (1914).

"The Use of Turned Sections in Tension Tests of Reinforcing Bars." XIV, Part II, 90 (1914).

NOLAN, THOMAS.

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 275 (1917).

Silica brick. XVII, Part II, 485, 493 (1917).

NORRIS, G. L.

Alloy steels. XVII, Part II, 49, 54 (1917).

Heat treatment of steel. XV, Part II, 39 (1915).

Resistance of steels to wear. XIII, 568 (1913).

"Resistance of Steels to Wear in Relation to Their Hardness and Tensile Properties." XIII, 562 (1913).

"Topical Discussion on the Rôle of the Several Alloying Elements in the Alloy Steels: The Rôle of Vanadium." XVII, Part II, 20 (1917).

NOYES, W. A.

Report of Committee E-4, Appendix: Preliminary Report of the Joint Committee on Coal Analysis of the American Society for Testing Materials and the American Chemical Society. (Chairman.) XIV, Part I, 410 (1914).

Report of Committee E-4, Appendix: Final Report of the Joint Committee on Coal Analysis of the American Society for Testing Materials and the American Chemical Society. (Chairman.) XV, Part I, 454 (1915).

NUSBAUM, C.

"Topical Discussion on Magnetic Analysis: Certain Aspects of Magnetic Analysis." XIX, Part II, 95 (1919).

O

OLFS, A. C.

Inspection of brass and bronze. XVII, Part II, 233 (1917).

OLSEN, T. Y.

"An Efficiency Testing Machine for Testing Drills, Taps and Dies." XIV, Part II, 541 (1914).

"A New Type of Automatic Cement Tester." XX, Part II, 408 (1920).

"Ductility Testing Machines." XX, Part II, 398 (1920).

OLSHAUSEN, G. R.

Elastic limit. XV, Part II, 432, 435 (1915).

Pressures on walls and bins. XV, Part II, 396 (1915).

Yield point and proportional limit. XVI, Part II, 443 (1916).

ONDERDONK, J. R.

A failed axle. XIV, Part II, 88 (1914).

Heat treatment of steel. XIII, 528 (1913).

Rail failures. XIII, 594 (1913).

Standard specifications for steel. XIV, Part I, 134, 135 (1914).

ORMSBEE, J. M.

Corrosion of metals. XIII, 626 (1913).

ORTON, EDWARD, JR.

Definition of the word "vitrified." XV, Part II, 265 (1915).

Report of Committee C-3, Appendix: "A Study of the Proposed A.S.T.M. Tentative Specifications for Building Brick and a Correlation of Their Requirements with Sodium-Sulfate Treatment and Actual Freezing." XIX, Part I, 268 (1919).

Report of Committee C-3 on Brick. (Chairman.) XX, Part I, 262 (1920).

Standard specifications for gypsum. XV, Part I, 185 (1915).

"The Legal Interpretation of the Word 'Vitrified' as Applied to Ceramic Products." XV, Part II, 245 (1915).

OSMOND, C. H.

Report of Committee D-2, Appendix: "Determination of Resistance of Lubricating Oils to Emulsification." XX, Part I, 416 (1920).

OWEN, JAMES.

Road-building rocks. XIII, 993 (1913).

P

PAGE, L. W.

"Relation between the Tests for the Wearing Qualities of Road-Building Rocks." XIII, 983 (1913).

PAGE. L. W. (*Continued*).

Report of Committee D-4 on Road Materials. (Chairman.) XIII, 448 (1913); XIV, Part I, 374 (1914); XV, Part I, 325 (1915); XVI, Part I, 300 (1916); XVII, Part I, 470 (1917); XVIII, Part I, 326 (1918).

Road-building rocks. XIII, 993, 994, 995 (1913).

Specific gravity of sand. XV, Part I, 356 (1915).

Toughness test for rock. XVII, Part II, 586, 587 (1917).

PANNELL, E. V.

Specifications for non-ferrous metals and alloys. XX, Part I, 248 (1920).

PARKER, J. H.

Modern high speed steel. XIX, Part II, 159 (1919).

PARKS, G. E.

Mobility of paint. XIX, Part II, 669 (1919).

PARR, S. W.

Coal. XIV, Part I, 455 (1914).

Report of Committee D-3 on Methods of Sampling and Analysis of Coal. (Chairman.) XIX, Part I, 391 (1919); XX, Part I, 427 (1920).

Report of Committee E-4 on Methods of Sampling and Analysis of Coal. (Chairman.) XIV, Part I, 409 (1914); XV, Part I, 453 (1915).

Report of Sub-Committee IV, of the Joint Committee on Coal Analysis, on Volatile Matter. (Chairman.) XIV, Part I, 424 (1914).

Report of Sub-Committee V, of the Joint Committee on Coal Analysis, on Fixed Carbon and Ash. (Chairman.) XIV, Part I, 426 (1914).

PATCH, N. K. B.

Inspection of brass and bronze. XVII, Part II, 235 (1917).

Report of Sub-Committee III, of Committee B-2, on Sand-Cast Metals and Alloys. XVII, Part I, 187, 188 (1917).

PEARSON, J. C.

Fineness of cement. XIX, Part II, 410 (1919).

PEASLEE, W. D. A.

"Testing of Porosity of Electrical Porcelain." XX, Part II, 495 (1920).

PEFFER, E. L.

Report of Sub-Committee V, of Committee D-1, on Linseed Oil, Appendix I: "Supplementary Report on Density and Thermal Expansion of Linseed Oil." XIV, Part I, 262 (1914).

PEIRCE, E. H.

Hardness of copper wire. XVII, Part II, 126 (1917).

"Hardness of Hard-Drawn Copper." XVII, Part II, 114 (1917).

PERRINE, HAROLD.

Heat-insulating materials. XVII, Part II, 443 (1917).

PETINOT, N. G.

Rail failures. XIII, 595 (1913).

PFUND, A. H.

"A New Colorimeter for White Pigments and Some Results Obtained by Its Use," XX, Part II, 440 (1920).

Colorimeter for white pigments. XX, Part II, 449 (1920).

Hiding power of paints. XX, Part II, 438 (1920).

PICKARD, G. H.

Acceptability of linseed oil. XVI, Part II, 246 (1916).

Report of Special Sub-Committee, of Committee D-1, on Specifications for Sampling of Liquids. (Chairman.) XV, Part I, 267 (1915).

Report of Sub-Committee E, of Committee D-1, on Linseed Oil. (Chairman.) XIII, 372 (1913).

Report of Sub-Committee V, of Committee D-1, on Linseed Oil. (Chairman.) XIV, Part I, 261 (1914); XV, Part I, 224 (1915); XVI, Part I, 283 (1916); XVII, Part I, 377 (1917); XVIII, Part I, 299 (1918).

Report of Sub-Committee V, of Committee D-1, Appendix: "Comments of Analysts." XV, Part I, 234 (1915). "Reports of Analysts." XVII, Part I, 379 (1917); XVIII, Part I, 301 (1918).

POMEROY, L. R.

Heat treatment of axles. XVI, Part II, 71 (1916).

POPE, G. S.

Report of Committee D-5 on Coal. (Secretary.) XIII, 458 (1913); XV, Part I, 357 (1915). (Chairman.) XVI, Part I, 319 (1916); XVIII, Part I, 334 (1918).

POTTS, S. C.

Report of Committee D-11 on Rubber Products. (Secretary.) XIX, Part I, 396 (1919); XX, Part I, 453 (1920).

PRICE, W. B.

Brass condenser tubes. XVI, Part II, 172 (1916).

Cast zinc. XIII, 698 (1913).

Corrosion cracking of brass. XVIII, Part II, 209 (1918).

Ductility testing machines. XX, Part II, 404 (1920).

Inspection of brass and bronze. XVII, Part II, 238 (1917).

Nomenclature of non-ferrous alloys. XX, Part I, 247 (1920).

Standard tests for lubricants. XIV, Part I, 373 (1914).

"Topical Discussion on Season and Corrosion Cracking of Brass: The Prevention of Season and Corrosion Cracking of Brass Artillery Cases by Special Heat Treatment." XVIII, Part II, 179 (1918).

PRIEST, I. G.

Report of Sub-Committee XII, of Committee D-1, on Turpentine, Appendix III: "Supplementary Report on Color of Turpentines." XIV, Part I, 340 (1914).

PRITCHARD, F. P.

"A New Consistency Tester for Viscous Liquid Bituminous Materials." XVII, Part II, 603 (1917).

PROBECK, E. J.

Report of Sub-Committee V, of Committee D-1, Appendix: "Reports of Analysts." XVII, Part I, 384 (1917).

PROVINE, L. H.

Report of Committee C-10 on Hollow Building Tile. (Chairman.) XVII, Part I, 335 (1917); XVIII, Part I, 293 (1918).

PROVOST, A. J., JR.

Report of Committee C-4 on Clay and Cement Sewer Pipe. (Vice-Chairman.) XIII, 302 (1913); XIV, Part I, 195 (1914); XV, Part I, 163 (1915); XVI, Part I, 220 (1916); XVII, Part I, 293 (1917); XVIII, Part I, 274 (1918); XIX, Part I, 305 (1919); XX, Part I, 263 (1920).

PULLAR, H. B.

Nomenclature of road materials. XIII, 454 (1913).

PURDY, R. C.
Refractory fire brick. XVI, Part II, 376 (1916).

Q

QUIMBY, H. H.
Final Report of the Joint Committee on Concrete and Reinforced Concrete XVII, Part I, 202 (1917).

R

RAMSAY, J. D.
Refractory bricks. XIX, Part II, 635 (1919).

RANDALL, T. A.
Standard specifications for brick. XIV, Part I, 194 (1914).

RATHJENS, GEORGE.
Testing of rubber goods. XIV, Part II, 624 (1914).

RAWDON, H. S.
Corrosion of iron and steel. XVII, Part I, 176 (1917).
Macroscopic etching of steel. XV, Part II, 99 (1915).
Report of Committee A-1, Appendix IV: "Report on Investigation of Ladle-Test Steel Ingots." XVI, Part I, 129 (1916).
Report of Committee A-1, Appendix II: Report of Ladle-Test Ingot Investigation. XIX, Part I, 154 (1919).
Report of Sub-Committee II, of Committee A-5, Appendix III: "Structure of Commercial Zinc Coatings." XVIII, Part I, 216 (1918).
Shattered zones in steel rails. XX, Part II, 61 (1920).
"Topical Discussion on Season and Corrosion Cracking of Brass: The Use of Mercury Solutions for Predicting Season Cracking in Brass." XVIII, Part II, 189 (1918).

RAY, G. J.
Report of Committee C-1, Appendix: Report of Sub-Committee on Accelerated Tests of Cement. XV, Part I, 147 (1915).

REA, A. S.
"Apparent Specific Gravity of Non-Homogeneous Fine Aggregates." XVII, Part II, 256 (1917).

REDDY, H. A.
Report of Sub-Committee III, of Committee D-1, Appendix: "Reports of Analysts on Perilla Oil." XVI, Part I, 280 (1916).

REESE, C. L.
"Topical Discussion on Cooperation in Industrial Research: Developments in Industrial Research." XVIII, Part II, 32 (1918).

REINECKE, L.
"The Sampling of Deposits of Road Stone and Gravel in the Field." XVIII, Part II, 393 (1918).
Toughness test for rock. XVII, Part II, 587 (1917).

REINKE, W. B.
"Observations on the Testing of Sand." XIII, 797 (1913).
Testing of sand. XIII, 808, 809, 811 (1913).

RETTEW, E. W.
Modern high speed steel. XIX, Part II, 176 (1919).

RHETT, A. H.
Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 264 (1917).

RICHARDSON, CLIFFORD.
Minority Report of Committee D-4 on Standard Tests for Road Materials. XIII, 450 (1913).

RIGG, GILBERT.
Cast zinc. XIII, 698 (1913).
Coal ash. XV, Part II, 346 (1915).
"Strength of Cast Zinc or Spelter." XIII, 669 (1913).

RINALD, C. D.
Microstructure of concrete. XV, Part II, 224 (1915).
Preservative coatings for structural materials. XIV, Part I, 351 (1914).

ROBBINS, F. A., JR.
Report of Committee A-1, Appendix V: Report on Permissible Variations in Weight and Gage of Sheared Plates. XIV, Part I, 125 (1914).

ROBINSON, A. F.
Corrosion of steel. XIX, Part II, 238 (1919).

ROBINSON, F. C.
Road materials. XVI, Part I, 317 (1916).

ROGERS, ALLEN.
Report of Sub-Committee IX, of Committee D-1, Appendix: "Reports of Analysts." XVII, Part I, 396 (1917).
Report of Sub-Committee IX, of Committee D-1, on Varnish. (Chairman.) XVII, Part I, 386 (1917); XVIII, Part I, 305 (1918).

ROOD, F. H.
Abrasion test of rock. XX, Part II, 291 (1920).
Specifications for broken slag. XX, Part I, 441 (1920).

RUDER, W. E.
Alloy steels. XVII, Part II, 45, 46 (1917).
Fatigue tests of steel. XIX, Part II, 219 (1919).
"Topical Discussion on the Rôle of the Several Alloying Elements in the Alloy Steels: The Rôle of Silicon." XVII, Part II, 15 (1917).

RYS, C. F. W.
Specifications for boiler steel for locomotives. XVIII, Part I, 141 (1918).
Specifications for steel forging blooms. XIII, 181 (1913).

S

SABIN, A. H.
Metal primer tests. XVII, Part II, 539, 549 (1917).
Permeability test of paints. XIV, Part II, 447 (1914).
Report of Sub-Committee IX, of Committee D-1, Appendix: Reports of Analysts. XVII, Part I, 391 (1917).

SACKETT, R. L.
Distribution of earth pressures. XVII, Part II, 659 (1917).

SADTLER, C. B.
Hardness testing. XVIII, Part II, 467 (1918).

SANFORD, R. L.

Report of Committee A-8 on Magnetic Analysis. (Secretary.) XX, Part I, 231 (1920).

"Topical Discussion on Magnetic Analysis: Application of Magnetic Analysis to the Testing of Ball Bearing Races," XIX, Part II, 68 (1919).

"Topical Discussion on Magnetic Analysis: Location of Flaws in Rifle Barrel Steel by Magnetic Analysis." XIX, Part II, 80 (1919).

SARGENT, C. L.

Report of Sub-Committee IX, of Committee D-1: "Reports of Analysts." XVIII, Part I, 307 (1918).

SARGENT, G. W.

"Molybdenum as an Alloying Element in Structural Steels." XX, Part II, 5 (1920).

Molybdenum in steels. XX, Part II, 29, 30 (1920).

SAUVEUR, ALBERT.

Report of Committee A-4 on Heat Treatment of Iron and Steel. (Chairman.) XIII, 188 (1913); XIV, Part I, 169 (1914); XVI, Part I, 152 (1916).

SCHAEFFER, J. A.

Metal primer tests. XVII, Part II, 545 (1917).

SCHALL, F. E.

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

Report of Committee C-1, Appendix: Report of Sub-Committee on Accelerated Tests of Cement, XV, Part I, 147 (1915).

SCHMITT, F. E.

Drain tile. XVI, Part I, 262 (1916).

SCHRAMM, EDWARD.

Corrosion cracking of brass. XVIII, Part II, 212 (1918).

SCHUHMANN, GEORGE.

Corrosion test for pipe. XVI, Part II, 346 (1916).

SCHUMANN, C. L.

"Examination of Chinese Wood Oil." XIV, Part II, 454 (1914).

SCHUYLER, MONT.

"A Machine for Testing Clay Products." XIV, Part II, 557 (1914).

Definition of the word "vitrified." XV, Part II, 265 (1915).

Determination of consistency. XIII, 1052 (1913).

Elastic limit. XV, Part II, 435 (1915).

"Spherical Bearings." XIII, 1004 (1913).

SCHWARTZ, H. A.

"Effect of Machining and of Cross-Section on the Tensile Properties of Malleable Cast Iron." XX, Part II, 70 (1920).

Malleable cast iron. XIX, Part II, 276 (1919).

"Some Physical Constants of American Malleable Cast Iron." XIX, Part II, 247 (1919).

SCOFIELD, H. H.

Abrasion test of rock. XX, Part II, 291 (1920).

"An Abrasion Test for Stone, Gravel and Similar Aggregates." XVIII, Part II, 416 (1918).

Cement-lime-sand mortars. XVII, Part II, 273 (1917).

Proportioning of concrete. XVII, Part II, 295 (1917).

SCOTT, H. L.

Report of Committee D-13, Appendix I: "Method of Studying the Action of Specimens of Textile Fabric During Tests." XVI, Part I, 363 (1916).

SCOTT, HOWARD.

Modern high speed steel. XIX, Part II, 179 (1919).

SEAMAN, H. B.

Proportioning concrete aggregates. XIV, Part II, 276 (1914).

SEATON, M. Y.

Report of Sub-Committee V, of Committee D-1, Appendix: Comments of Analysts. XVI, Part I, 289 (1916); "Reports of Analysts." XVII, Part I, 382 (1917); XVIII, Part I, 303 (1918).

Report of Sub-Committee IX, of Committee D-1, Appendix: "Reports of Analysts." XVII, Part I, 391, 392, 394, 395, 396, 397, 398, 399, 400, 401 (1917); XVIII, Part I, 307 (1918).

SEELY, F. B.

"Constants and Diagrams for Repeated-Stress Calculations." XVI, Part II, 470 (1916).

"The Failure of Materials under Repeated Stress." XV, Part II, 437 (1915).

"The Relation between Yield Point and Proportional Limit in Various Grades of Steel." XVI, Part II, 426 (1916).

SHARPLES, P. P.

Apparatus for Determination of Breaking Point of Pitches." XIX, Part II, 782 (1919).

Breaking point of pitches. XIX, Part II, 790 (1919).

"Methods for Determining the Melting Points of Asphalts." XIV, Part II, 502 (1914).

Nomenclature of road materials. XIII, 454 (1913).

Waterproofing. XIII, 959 (1913).

SHORE, A. F.

"Notes on the Property of Toughness of Metals." XIII, 612 (1913).

Rail failures. XIII, 604 (1913).

SHUMAN, J. J.

Elastic limit. XV, Part II, 431, 434 (1915).

Specifications for boiler steel for locomotives. XVIII, Part I, 140 (1918).

Specifications for steel tie plates. XVII, Part I, 123 (1917).

SISSON, F. P.

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

SKINNER, C. E.

Adoption of standards. XIV, Part II, 650, 651 (1914).

Insulating materials. XVII, Part I, 491, 492 (1917).

Report of Committee A-8 on Standard Specifications for Cold-Drawn Steel. (Chairman.) XIII, 190 (1913); XIV, Part I, 172 (1914); XV, Part I, 132 (1915).

Report of Committee D-9 on Electrical Insulating Materials. (Chairman.) XV, Part I, 407 (1915); XVII, Part I, 489 (1917); XVIII, Part I, 349 (1918).

Report of Committee E-5 on Standing Committees. (Vice-Chairman.) XVII, Part I, 512 (1917).

Standard methods of testing. XV, Part I, 449 (1915).

Testing of rubber goods. XIV, Part II, 625 (1914).

SLATER, W. A.

Corrosion of iron and steel. XVII, Part I, 175, 177 (1917).

Distribution of earth pressures. XVII, Part II, 658 (1917).

Excess water in concrete. XVII, Part II, 392 (1917).

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 279 (1917).

Fireproofing. XVII, Part I, 300, 303, 304, 305 (1917).

Heat-insulating materials. XVII, Part II, 443 (1917).

Insulating materials. XVII, Part I, 491, 492 (1917).

Modulus of elasticity of concrete. XX, Part II, 258, 261 (1920).

Reinforced concrete slabs. XIII, 874, 881, 882 (1913).

Strain gages. XIII, 1043 (1913).

"Use of the Strain Gage in the Testing of Materials." XIII, 1019 (1913).

SLOCUM, F. S.

Simple overstrain. XIV, Part II, 41 (1914).

SMITH, E. B.

"An Apparatus for Determining Soil Pressures." XVI, Part II, 309 (1916).

Microstructure of concretes. XV, Part II, 214 (1915).

SMITH, F. G.

Corrosion cracking of brass. XVIII, Part II, 210 (1918).

SMITH, F. P.

Asphalt content of road oils. XX, Part II, 320, 322 (1920).

Petroleum residuals. XX, Part II, 312 (1920).

SMITH, H. E.

Insulating materials. XVII, Part I, 491 (1917).

Non-ferrous castings. XIV, Part II, 159 (1914).

Non-ferrous metals. XVI, Part I, 196 (1916).

Report of Committee A-2 on Wrought Iron. (Chairman.) XVIII, Part I, 142 (1918); XIX, Part I, 174 (1919); XX, Part I, 143 (1920).

Specifications for boiler steel for locomotives. XVIII, Part I, 138 (1918).

Specifications for structural steel for cars. XVIII, Part I, 136, 137 (1918).

SMITH, J. HAMMOND.

"A Laboratory Method of Determining Pressures on Walls and Bins." XV, Part II, 382 (1915).

Distribution of earth pressures. XVII, Part II, 658 (1917).

Pressures on walls and bins. XV, Part II, 396 (1915).

SMITHER, F. W.

Report of Sub-Committee VIII, of Committee D-1, on Methods of Analysis of Paint Materials. (Chairman.) XIV, Part I, 267 (1914); XV, Part I, 238 (1915); XVII, Part I, 385 (1917); XVIII, Part I, 304 (1918).

SOMERVILLE, A. A.

Textile materials. XVI, Part I, 387 (1916).

SPACKMAN, H. S.

Autoclave tests for cement. XIII, 763 (1913).

Cement mortars. XIII, 824, 826 (1913).

Coal ash. XV, Part II, 345 (1915).

"Estimation of Fine Particles in Cement by Rate of Hydration." XIII, 714 (1913).

Excess water in concrete. XVII, Part II, 391 (1917).

Finer grinding of Portland cement. XV, Part II, 150 (1915).

SPACKMAN, H. S. (*Continued*).
Hydration of cement. XIII, 737 (1913).
Microstructure of concretes. XV, Part II, 220 (1915).
Report of Committee C-7 on Lime. (Chairman.) XIII, 313 (1913).
Specifications for lime. XIII, 320, 326 (1913).
Standard specifications for gypsum. XV, Part I, 181, 183 (1915).
Testing of sand. XIII, 809 (1913).

SPELLER, F. N.
Corrosion test for pipe. XVI, Part II, 347 (1916).
Failure of boiler tubes. XVI, Part II, 112, 116 (1916).
"Method for Testing the Durability of Pipe Under Corrosion." XVI, Part II, 343 (1916).
Shipping containers. XIII, 1098 (1913).

SPRING, L. W.
Report of Sub-Committee III, of Committee B-2, on Sand-Cast Metals and Alloys. XVII, Part I, 192 (1917).

STALKNECHT, A. C.
Emulsification of lubricating oils. XVI, Part II, 268 (1916).
Standard tests for lubricants. XV, Part I, 311 (1915).

STEELE, L. L.
Report of Sub-Committee III, of Committee D-1: "A New Hexabromide Test for Linseed Oil." XIX, Part I, 396 (1919).

STEVENSON, A. A.
Annual Report of the Executive Committee. (President.) XVII, Part I, 56 (1917).
Heat treatment of steel. XIII, 529 (1913).
Memorial Session in Honor of the Memory of Edgar Marburg: Closing Remarks by the Chairman. XIX, Part I, 57 (1919). Personal Tribute. XIX, Part I, 79 (1919).
"Our Society." (Annual Address by the President.) XVII, Part I, 34 (1917).
Specifications for steel wheels. XIII, 176, 177 (1913).
Specifications for wooden paving blocks. XVIII, Part I, 346 (1918).
Standard specifications for steel. XIV, Part I, 131, 138 (1914).
Turin Meeting of the Council of the International Association for Testing Materials. XIV, Part I, 79 (1914).

STEWART, J. T.
Report of Committee C-6 on Drain Tile. (Secretary.) XIII, 303 (1913); XIV, Part I, 208 (1914); XV, Part I, 165 (1915); XVI, Part I, 259 (1916); XX, Part I, 268 (1920).

STONE, G. C.
Refractory bricks. XIX, Part II, 634 (1919).
Refractory fire brick. XVI, Part II, 374 (1916).
Report of Sub-Committee XV, of Committee D-1, on Specifications for Pigments Dry and in Oil When Marketed in the Form. (Chairman.) XVII, Part I, 458 (1917).
Shipping containers. XIII, 1100 (1913).
Silica brick. XVII, Part II, 486 (1917).

STRATTON, S. W.
Minority Report of Committee D-2 on Standard Tests for Lubricants. XIV, Part I, 366 (1914).
Report of Sub-Committee XII, of Committee D-1, on Turpentine, Appendix III: "Supplementary Report on Color of Turpentines." XIV, Part I, 340 (1914).

STREHAN, G. E.

Fireproofing. XVII, Part I, 301, 303, 304, 305 (1917).

Heat-insulating materials. XVII, Part II, 445 (1917).

STURCKE, H. E.

Shipping containers. XIII, 1101 (1913).

SWAIN, F. W.

"An Investigation of the Strength and Elastic Properties of Concrete-Filled Pipe Columns." XV, Part II, 230 (1915).

SWAIN, G. F.

Report of Committee C-1 on Cement. (Chairman.) XIII, 221 (1913); XIV, Part I, 183 (1914); XV, Part I, 144 (1915); XVI, Part I, 200 (1916).

SWAN, O. T.

Report of Committee D-7, Appendix III: "Southern Yellow-Pine Timber and Density Grading Rules." XV, Part I, 385 (1915).

SWEETSER, R. H.

Methods for analysis of cast iron. XV, Part I, 128 (1915).

SWENSSON, EMIL.

Final Report of the Joint Committee on Concrete and Reinforced Concrete. (Vice-Chairman.) XVII, Part I, 202 (1917).

SWETT, C. E.

Report of Committee D-13, Appendix IV: "Identification of Manila Fiber." XVIII, Part I, 377 (1918).

T

TALBOT, A. N.

Addresses by Past-Presidents. XVII, Part I, 51 (1917).

Adoption of standards. XIV, Part II, 655 (1914).

Annual Report of the Executive Committee. (President.) XIV, Part I, 39 (1914).

Concrete aggregate for highways. XX, Part II, 277 (1920).

Effect of rodding concrete. XX, Part II, 231 (1920).

Elasticity of concrete. XIX, Part II, 586 (1919).

Failure of a tile drain. XVII, Part II, 464 (1917).

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202, 276, 280 (1917).

"Memorial Session in Honor of the Memory of Edgar Marburg: Edgar Marburg—His More Recent Service in the Society." XIX, Part I, 52 (1919).

Modulus of elasticity of concrete. XX, Part II, 262 (1920).

Powdered admixtures in concrete. XX, Part II, 206 (1920).

Proportioning mortars. XVIII, Part II, 291 (1918).

Proportioning of concrete. XIX, Part II, 481, 502 (1919).

Specifications for brick. XIII, 301 (1913).

Specifications for wooden paving blocks. XVIII, Part I, 346 (1918).

Standard methods of testing. XIV, Part I, 405, 406, 407 (1914).

Standard specifications for gypsum. XV, Part I, 184 (1915).

Standard tests for lubricants. XIV, Part I, 368, 369, 371 (1914).

Strain gages. XIII, 1041 (1913).

Testing of rubber goods. XIV, Part II, 624, 634 (1914).

"The Relation between Research and the Activities of the Society." (Annual Address by the President.) XIV, Part I, 31 (1914).

Volume changes in cement. XIV, Part II, 242 (1914).

TAYLOR, C. M.

Specifications for wooden paving blocks. XVIII, Part I, 345 (1918).

TAYLOR, D. G.

"The So-Called Asphalt Content of Road Oils." XX, Part II, 314 (1920).

TEMPLIN, R. L.

Fatigue testing machine. XIX, Part II, 717 (1919).

Stresses caused by cold rolling. XX, Part II, 41 (1920).

THACKRAY, G. E.

Adoption of standards. XIV, Part II, 656 (1914).

Simple overstrain. XIV, Part II, 39 (1914).

Specifications for steel tie plates. XVII, Part I, 122 (1917).

Standard methods of testing. XV, Part I, 451, 452 (1915).

Standard specifications for steel. XIV, Part I, 136 (1914).

Testing galvanized coatings. XX, Part II, 425 (1920).

THOMAS, J. J.

Hardness tests. XIV, Part II, 75 (1914).

"Hardness Tests: Relation between Brinell Ball-Test and Scleroscope Readings." XIV, Part II, 72 (1914).

"The Charpy Impact Test on Heat-Treated Steels." XV, Part II, 62 (1915).

THOMPSON, G. W.

Colorimeter for white pigments. XX, Part II, 449 (1920).

Metal primer tests. XVII, Part II, 543, 546 (1917).

Mobility of paint. XIX, Part II, 665 (1919).

Permeability test of paints. XIV, Part II, 436 (1914).

Priming values of paints. XIII, 954 (1913)

Report of Committee D-1 on Preservative Coatings for Structural Materials. (Secretary.) XIII, 329 (1913); XIV, Part I, 221 (1914); XV, Part I, 186 (1915); XVI, Part I, 270 (1916); XVII, Part I, 363 (1917); XVIII, Part I, 297 (1918); XIX, Part I, 361 (1919); XX, Part I, 387 (1920).

Report of Sub-Committee III, of Committee D-1, Appendix: "Reports of Analysts on Perilla Oil." XVI, Part I, 280 (1916). Appendix: "Reports of Analysts on Lumbang and Perilla Oils." XVII, Part I, 371 (1917).

Report of Sub-Committee V, of Committee D-1, Appendix: "Comments of Analysts." XV, Part I, 233 (1915); "Reports of Analysts." XVII, Part I, 378 (1917).

Report of Sub-Committee VI, of Committee D-1, on Definitions of Terms Used in Paint Specifications. (Chairman.) XV, Part I, 237 (1915).

Report of Sub-Committee F, of Committee D-1, on the Definition of Terms Used in Paint Specifications. (Chairman.) XIII, 402 (1913).

The plastometer and its application. XX, Part II, 488 (1920).

THOMPSON, SANFORD E.

Cement mortars. XIII, 822 (1913).

Excess water in concrete. XVII, Part II, 391 (1917).

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202, 272, 278 (1917).

Microstructure of concretes. XV, Part II, 218, 219 (1915).

Proportioning concrete aggregates. XIV, Part II, 274 (1914).

Proportioning of concrete. XIX, Part II, 485 (1919).

Quick-hardening cements. XIX, Part II, 439 (1919).

Report of Committee C-9, Appendix: "Abrams-Harder Field Test for Organic Impurities in Sands." (Chairman.) XIX, Part I, 321 (1919).

THOMPSON, SANFORD E. (*Continued*).

Report of Committee C-9 on Concrete and Concrete Aggregates. (Chairman.) XV, Part I, 173 (1915); XVI, Part I, 264 (1916); XVII, Part I, 319 (1917); XIX, Part I, 318 (1919); XX, Part I, 291 (1920).

Specifications for cement. XVI, Part I, 213 (1916).

Testing of sand. XIII, 807, 809 (1913).

TIEMANN, H. P.

Heat treatment of steel. XIII, 533 (1913).

Report of Committee A-1, Appendix IV: Report on Proof Tests of Finished Forgings. (Chairman.) XIV, Part I, 120 (1914).

Specifications for steel wheels. XIII, 177 (1913).

Standard methods of testing. XIV, Part I, 407 (1914).

TILLYER, E. D.

Report of Sub-Committee XII, of Committee D-1, on Turpentine, Appendix II: "Supplementary Report on Refractive Indices of Turpentines." XIV, Part I, 338 (1914).

TILT, E. B.

Chilled cast iron. XIV, Part II, 122, 124 (1914).

"Notes on Chilled Cast Iron." XIV, Part II, 110 (1914).

Report of Committee D-11 on Standard Specifications for Rubber Products. (Chairman.) XIII, 466 (1913); XIV, Part I, 387 (1914).

Specifications for rubber products. XIV, Part I, 388, 389 (1914).

Testing of rubber goods. XIV, Part II, 638 (1914).

TOCH, MAXIMILIAN.

Paint protection for portland-cement surfaces. XIV, Part II, 495 (1914).

TOPPING, W. S.

Report of Committee D-10 on Shipping Containers. (Secretary.) XVII, Part I, 493 (1917); XVIII, Part I, 350 (1918); XIX, Part I, 395 (1919); XX, Part I, 449 (1920).

TOUCEDA, ENRIQUE.

Malleable cast iron. XIX, Part II, 273 (1919).

Report of Committee A-7 on Malleable Castings. (Secretary.) XIX, Part I, 248 (1919).

TURNEAURE, F. E.

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

Report of Committee C-2 on Reinforced Concrete. (Chairman.) XIII, 223 (1913); XVII, Part I, 201 (1917); XVIII, Part I, 273 (1918).

TUTTLE, J. B.

Standard specifications for rubber products. XV, Part I, 435, 436 (1915).

U

UNGER, J. S.

Deep etching of rails and forgings. XIX, Part II, 198 (1919).

Heat treatment of axles. XVI, Part II, 68 (1916).

Heat treatment of steel. XIII, 531 (1913).

Magnetic analysis. XIX, Part II, 137 (1919).

Magnetic testing. XVII, Part II, 105 (1917).

Refractory brick. XVIII, Part II, 348 (1918); XIX, Part II, 630 (1919).

Refractory fire brick. XVI, Part II, 373 (1916).

Silica brick. XVII, Part II, 483, 485, 493 (1917).

UNGER, J. S. (*Continued*).

Slag concrete. XIV, Part II, 291 (1914).

"Topical Discussion on Cooperation in Industrial Research: Some Practical Views of Research." XVIII, Part II, 62 (1918).

UPHAM, C. M.

Breaking point of pitches. XIX, Part II, 790 (1919).

Powdered admixtures in concrete. XX, Part II, 204, 208 (1920).

UPTON, G. B.

Tests for lubricants. XV, Part I, 295, 322 (1915).

V

VAN DOORN, H. D.

Cast steel chain. XVIII, Part II, 141 (1918).

VAN GUNDY, C. P.

Report of Committee D-2 on Lubricants. (Chairman.) XV, Part I, 273 (1915); XVII, Part I, 462 (1917); XVIII, Part I, 321 (1918); XIX, Part I, 388 (1919); XX, Part I, 406 (1920).

Standard tests for lubricants. XV, Part I, 323 (1915).

VEITCH, F. P.

Colorimeter for white pigments. XX, Part II, 449 (1920).

Hiding power of paints. XX, Part II, 437 (1920).

Report of Sub-Committee XII, of Committee D-1, on Turpentine. (Chairman.) XIV, Part I, 316 (1914); XV, Part I, 263 (1915); XIX, Part I, 371 (1919); XX, Part I, 405 (1920).

Specifications for lime. XIII, 321 (1913).

VON SCHRENK, HERMANN.

Report of Committee D-7 on Timber. (Chairman.) XIV, Part I, 385 (1914); XV, Part I, 362 (1915); XVI, Part I, 327 (1916); XVII, Part I, 483 (1917); XVIII, Part I, 336 (1918); XX, Part I, 446 (1920).

Specifications for wooden paving blocks. XVIII, Part I, 340, 343, 345 (1918).

Standard specifications for timber. XV, Part I, 402, 403, 404 (1915).

VOORHEES, S. S.

Chinese wood oil. XIII, 942 (1913).

Color of pigments. XVII, Part II, 527 (1917).

Corrosion of iron and steel. XVII, Part I, 175, 176 (1917); XVIII, Part I, 242 (1918); XIX, Part I, 247 (1919).

Corrosion of metals. XIII, 626 (1913).

Heating test of asphalts. XVII, Part II, 638 (1917).

Magnetic testing. XVII, Part II, 107 (1917).

Metal primer tests. XVII, Part II, 545 (1917).

Mobility of paint. XIX, Part II, 671 (1919).

Permeability test of paints. XIV, Part II, 440 (1914).

Report of Committee A-5 on Corrosion of Iron and Steel. (Chairman.) XV, Part I, 130 (1915); XVI, Part I, 153 (1916); XVII, Part I, 143 (1917); XVIII, Part I, 158 (1918); XIX, Part I, 177 (1919); XX, Part I, 145 (1920).

Report of Committee C-1, Appendix: Report of Sub-Committee on Accclerated Tests of Cement. XV, Part I, 147 (1915).

Report of Committee E-5, Appendix II: Statement of Sub-Committee on Classification of Standing Committees and Standards. XVII, Part I, 519 (1917).

VOORHEES, S. S. (*Continued*).

Report of Sub-Committee X, of Committee D-1, on Inspection of White-Paint Test Fence at Washington, D. C. (Chairman.) XIV, Part I, 287 (1914); XV, Part I, 239 (1915).

Specifications for carbon tool steel. XVII, Part I, 128 (1917).

Specifications for cold-drawn steel. XIII, 195 (1913).

Specifications for rubber products. XIV, Part I, 389 (1914).

Testing of rubber goods. XIV, Part II, 625, 626, 637 (1914).

Test for metallic coatings. XIV, Part II, 480 (1914).

Tin, terne and lead-coated sheets. XIV, Part II, 169 (1914).

VREDENBURGH, WATSON, JR.

Hydration of cement. XIII, 737 (1913).

W

WAGNER, S. T.

"Coal-Tar and Asphalt Products for Waterproofing." XIII, 955 (1913).

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

Report of Committee C-9 on Reinforced Concrete. (Secretary.) XIX, Part I, 264 (1919); XX, Part I, 253 (1920).

Waterproofing. XIII, 961, 964 (1913).

WAIDNER, C. W.

Report of Committee D-2, Appendix: "Conversion Tables for Saybolt Universal, Engler and Redwood Viscosimeters." XV, Part I, 284 (1915).

WALCOTT, W. D.

"The Volume-Moisture Relation in Sand and a Method of Determining Surface Area Based Thereon." XX, Part II, 137 (1920).

WALDO, LEONARD.

Standard specifications for cast iron. XIV, Part I, 164 (1914).

WALEN, E. D.

Report of Committee D-13:

Appendix III: "Comparison of Strip and Grab Methods of Testing Textile Fabric for Tensile Strength." XVI, Part I, 370 (1916).

Appendix IV: "Determination of Tensile Strength of Duck by the Strip Method." XVI, Part I, 379 (1916).

Report of Committee D-13, Appendix: Report of Sub-Committee III on Testing Machines. (Chairman.) XVIII, Part I, 370 (1918).

WALKER, P. H.

Cement mortars. XIII, 822 (1913).

Color of pigments. XVII, Part II, 527 (1917).

Preservative coatings for structural materials. XIV, Part I, 351, 353 (1914); XV, Part I, 270 (1915).

Report of Committee D-1 on Preservative Coatings for Structural Materials. (Chairman.) XIII, 329 (1913); XIV, Part I, 221 (1914); XV, Part I, 186 (1915); XVI, Part I, 270 (1916); XVII, Part I, 363 (1917); XVIII, Part I, 297 (1918); XIX, Part I, 361 (1919); XX, Part I, 387 (1920).

Report of Sub-Committee J, of Committee D-1, on the Testing of White Paints. (Chairman.) XIII, 406 (1913).

Spelter coating on sheets and wire. XV, Part II, 124 (1915).

Standard specifications for rubber products. XV, Part I, 436, 437 (1915).

Standard tests for lubricants. XV, Part I, 305 (1915).

WALKER, STANTON.

Elasticity of concrete. XIX, Part II, 586, 601 (1919).

"Modulus of Elasticity of Concrete." XIX, Part II, 510 (1919).

Modulus of elasticity of concrete. XX, Part II, 250 (1920).

WALKER, W. H.

Report of Committee A-5 on Corrosion of Iron and Steel. (Secretary.) XV, Part I, 130 (1915).

WALTER, L. W.

Report of Committee D-8 on Waterproofing. (Acting Chairman.) XVIII, Part I, 347 (1918).

Slag concrete. XIV, Part II, 288 (1914).

WARE, E. E.

"Examination of Chinese Wood Oil." XIV, Part II, 454 (1914).

Paint protection for portland-cement surfaces. XIV, Part II, 497 (1914).

WARING, F. M.

Addendum to Report of Committee A-1: Report of Sub-Committee XVI on Cast-Steel Chain. (Chairman.) XVIII, Part I, 133 (1918).

"Deep Etching of Rails and Forgings." XIX, Part II, 182 (1919).

Deep etching of rails and forgings. XIX, Part II, 190, 202 (1919).

Report of Committee A-1 on Steel. (Chairman.) XX, Part I, 113 (1920).

Report of Committee D-11 on Rubber Products. (Secretary.) XV, Part I, 408 (1915); XVI, Part I, 357 (1916); XVII, Part I, 494 (1917); XVIII, Part I, 354 (1918).

Testing of rubber goods. XIV, Part II, 626 (1914).

WARNER, CHARLES.

Specifications for lime. XIII, 327 (1913).

WARWICK, C. L.

Addendum to Report of Committee A-1. (Secretary.) XVIII, Part I, 128 (1918); XIX, Part I, 171 (1919).

Annual Report of the Executive Committee. (Assistant Secretary.) XIX, Part I, 95 (1919). (Secretary-Treasurer.) XX, Part I, 43 (1920).

"Memorial Session in Honor of the Memory of Edgar Marburg: Biographical Sketch of Edgar Marburg." XIX, Part I, 58 (1919).

Report of Committee A-1 on Steel. (Secretary.) XIV, Part I, 80 (1914); XV, Part I, 79 (1915); XVI, Part I, 86 (1916); XVII, Part I, 86 (1917); XVIII, Part I, 100 (1918); XIX, Part I, 138 (1919); XX, Part I, 113 (1920).

Report of Committee E-5 on Standing Committees. (Chairman.) XX, Part I, 477 (1920).

Report of Committee E-6 on Papers and Publications. (Chairman.) XIX, Part I, 424 (1919); XX, Part I, 481 (1920).

WASHBURN, F. M.

Report of Sub-Committee III, of Committee D-1: "A New Hexabromide Test for Linseed Oil." XX, Part I, 396 (1920).

WASON, L. C.

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

WEBBERT, L. P.

Non-ferrous castings. XIV, Part II, 159, 160 (1914).

Report of Sub-Committee III, of Committee B-2, on Sand-Cast Metals and Alloys. XVII, Part I, 182 (1917).

"Study of the Strength of Non-Ferrous Castings: Comparison of Different Test Specimens." XIV, Part II, 145 (1914).

WEBSTER, G. S.

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

Report of Committee C-1, Appendix: Report of Sub-Committee on Accelerated Tests of Cement. XV, Part I, 147 (1915).

WEBSTER, WILLIAM R.

Heat treatment of steel. XIII, 527 (1913).

International standard specifications. XVI, Part II, 489 (1916).

"National Standard Specifications and Their Relation to Export Trade." XVI, Part II, 476 (1916).

Rail failures. XIII, 597 (1913).

Report of Committee A-1 on Steel. (Chairman.) XIII, 58 (1913).

Specifications for steel forging blooms. XIII, 182 (1913).

WEBSTER, W. REUBEN.

Brass condenser tubes. XVI, Part II, 168, 175 (1916).

"Considerations Affecting Specifications for Wrought Non-Ferrous Materials." XIV, Part II, 127 (1914).

Inspection of brass and bronze. XVII, Part II, 229, 237 (1917).

"Interior Surface Defects on Brass Condenser Tubes as a Cause of Corrosion." XVII, Part II, 204 (1917).

"Light *versus* Heavy Reductions in Cold Working Brass." XVII, Part II, 156 (1917).

Reduction in working brass. XVII, Part II, 162 (1917).

Stresses caused by cold rolling. XX, Part II, 40 (1920).

"Topical Discussion on Season and Corrosion Cracking of Brass: Season Cracking." XVIII, Part II, 163 (1918).

Wrought non-ferrous materials. XIV, Part II, 141, 142, 143, 144 (1914).

WEISS, J. M.

"Some Experiments on Technical Bitumens." XV, Part II, 274 (1915).

Technical bitumens. XV, Part II, 295 (1915).

WERTZ, F. A.

Report of Sub-Committee III, of Committee D-1, Appendix: "Reports of Analysts on Lumbang and Perilla Oils." XVII, Part I, 372 (1917).

Report of Sub-Committee V, of Committee D-1, Appendix: "Reports of Analysts." XVII, Part I, 380 (1917); XVIII, Part I, 303 (1918).

Report of Sub-Committee IX, of Committee D-1, Appendix: "Reports of Analysts." XVII, Part I, 391, 394, 395, 397, 398, 399, 400, 401 (1917).

WEST, T. D.

Chilled cast iron. XIV, Part II, 121 (1914).

Standard specifications for cast iron. XIV, Part I, 165 (1914).

WHITE, A. E.

"An Investigation Leading to Specifications for Brass Condenser Tubes." XVI, Part II, 151 (1916).

Annealing temperatures and grain growth. XVII, Part II, 82 (1917).

Brass condenser tubes. XVI, Part II, 174, 175 (1916).

Failure of boiler tubes. XVI, Part II, 115 (1916).

"Recrystallization as a Factor in the Failure of Boiler Tubes." XVI, Part II, 80 (1916).

Reduction in working brass. XVII, Part II, 162 (1917).

WHITE, A. H.

Volume changes in cement. XIV, Part II, 244 (1914).

"Volume Changes in Portland Cement and Concrete." XIV, Part II, 203 (1914).

WHITE, F. F.
"Battery Zincs: Some Causes of Defective Service." XV, Part II, 112 (1915).

WHITE, G. D.
Permeability test of paints. XIV, Part II, 449 (1914).
Report of Sub-Committee III, of Committee D-1, Appendix: "Reports of Analysts on Lumbang and Perilla Oils." XVII, Part I, 370 (1917).

WHITE, J. A.
Molybdenum in structural steels. XX, Part II, 30 (1920).

WHITTEMORE, H. L.
Fatigue testing machine. XIX, Part II, 717 (1919).

WICKHORST, M. H.
Deep etching of rails and forgings. XIX, Part II, 201 (1919).
"Rail Failures and Their Causes." XIII, 582 (1913).
Repeated stress. XV, Part II, 463 (1915).
Shattered zones in steel rails. XX, Part II, 67 (1920).

WIG, R. J.
Adoption of standards. XIV, Part II, 650 (1914).
Autoclave tests for cement. XIII, 751 (1913); XIV, Part II, 252 (1914).
Cement mortars. XIII, 825, 827 (1913).
Concrete failures. XIV, Part II, 336 (1914).
Determination of consistency. XIII, 1052 (1913).
Excess water in concrete. XVII, Part II, 385, 386 (1917).
Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 266, 274, 278, 280 (1917).
Hydration of cement. XIII, 737 (1913).
Microstructure of concretes. XV, Part II, 215, 225 (1915).
Proportioning concrete aggregates. XIV, Part II, 276 (1914).
Report of Committee C-11 on Gypsum. (Chairman.) XV, Part I, 179 (1915); XVI, Part I, 268 (1916); XIX, Part I, 325 (1919).
Report of Committee D-4, Appendix I: Report of Special Joint Committee Appointed to Consider Definitions of Road Materials. XV, Part I, 337 (1915).
Specifications for concrete aggregates. XVI, Part II, 189 (1916).
Specifications for lime. XIII, 324, 328 (1913).
Standard specifications for gypsum. XV, Part I, 181, 182, 184, 185 (1915).
Strength of concrete. XVII, Part II, 358 (1917).
Time of setting of cement. XIV, Part II, 194, 200 (1914).
Volume changes in cement. XIV, Part II, 243 (1914).

WILLE, H. V.
Heat treatment of steel. XV, Part II, 23, 25, 40 (1915).
"Internal Stresses Developed by Different Quenching Mediums and Their Effects." XV, Part II, 27 (1915).
Report of Committee E-3 on Revision of Pipe Threads. (Chairman.) XVII, Part I, 504 (1917); XVIII, Part I, 422 (1918).
Strength and hardness of steels. XV, Part II, 60 (1915).

WILLIAMS, G. M.
Elasticity of concrete. XIX, Part II, 594 (1919).
"Errors in the Methods of Determining the Time of Setting of Cement." XIV, Part II, 172 (1914).

WILLIAMS, G. M. (*Continued*).
Modulus of elasticity of concrete. XX, Part II, 262 (1920).
Proportioning of concrete. XIX, Part II, 476, 497 (1919).
"Some Determinations of the Stress-Deformation Relations for Concretes under Repeated and Continuous Loadings." XX, Part II, 233 (1920).
"Strength of Cast Zinc or Spelter." XIII, 669 (1913).
Time of setting of cement. XIV, Part II, 200 (1914).

WILLIAMS, S. R.
"Topical Discussion on Magnetic Analysis: The Magnetic-Mechanical Analysis of Cast Iron." XIX, Part II, 130 (1919).

WILSON, J. J.
Breaking point of pitches. XIX, Part II, 790 (1919).

WILSON, L. A.
"The Evaluation of Zinc Dust: A Proposed Method of Analysis." XVIII, Part II, 220 (1918).

WILSON, P. H.
Specifications for cement. XVI, Part I, 213 (1916).
Volume changes in cement. XIV, Part II, 242 (1914).

WILSON, R. E.
The plastometer and its application. XX, Part II, 493 (1920).

WILSON, T. R. C.
"The Development of a Box-Testing Machine and Some Results of Tests." XVI, Part II, 320 (1916).

WITHEY, M. O.
"Tests of Mortars Made from Wisconsin Aggregates." XIII, 834 (1913).

WITHROW, E. P.
Reinforcing bars. XIV, Part II, 107 (1914).
"The Use of Turned Sections in Tension Tests of Reinforcing Bars." XIV, Part II, 90 (1914).

WOOD, H. F.
"Recrystallization as a Factor in the Failure of Boiler Tubes." XVI, Part II, 80 (1916).

WOOD, WALTER.
Report of Committee A-3, Appendix I: Progress Report of the American Members of International Committee 1 (*b*) on Specifications for Cast Iron. XIV, Part I, 149 (1914).
Standard specifications for cast iron. XIV, Part I, 166 (1914).

WOODROFFE, G. H.
Specifications for steel forging blooms. XIII, 179 (1913).

WOODWARD, R. W.
Molybdenum in structural steels. XX, Part II, 30 (1920).
Non-ferrous metals and alloys. XIX, Part I, 259 (1919).
Stresses caused by cold rolling. XX, Part II, 38 (1920).
"The Behavior of Wrought Manganese Bronze Exposed to Corrosion while under Tensile Stress." XIX, Part II, 278 (1919).
"Topical Discussion on Season and Corrosion Cracking of Brass: Initial Stress and Corrosion Cracking." XVIII, Part II, 165 (1918).

WOOLSON, I. H.

Heat-insulating materials. XVII, Part II, 448 (1917).

Report of Committee C-5 on Fireproofing Materials. (Chairman.) XIV, Part I, 206 (1914); XVII, Part I, 295 (1917); XVIII, Part I, 281 (1918).

Shipping containers. XVIII, Part I, 352 (1918).

WORCESTER, J. R.

Final Report of the Joint Committee on Concrete and Reinforced Concrete. (Chairman.) XVII, Part I, 202 (1917).

Y

YATES, J. J.

Final Report of the Joint Committee on Concrete and Reinforced Concrete. XVII, Part I, 202 (1917).

YOUNG, C. D.

Heat treatment of axles. XVI, Part II, 71, 77, 78 (1916).

"Heat Treatment of Carbon-Steel Locomotive Axles: Water *vs.* Oil Quenching." XVI, Part II, 53 (1916).

Repeated stress. XV, Part II, 464 (1915).

Report of Committee A-1 on Steel. (Chairman.) XIV, Part I, 80 (1914); XV, Part I, 79 (1915); XVI, Part I, 86 (1916); XVII, Part I, 86 (1917).

Specifications for carbon tool steel. XVII, Part I, 125 (1917).

Specifications for cold-drawn steel. XIII, 195 (1913).

Specifications for steel forging blooms. XIII, 180 (1913).

Specifications for steel tie plates. XVII, Part I, 121 (1917).

Specifications for steel wheels. XIII, 179 (1913).

Standard specifications for steel. XIV, Part I, 139 (1914).

Standard tests for lubricants. XIV, Part I, 371, 372 (1914).

Textile materials. XVI, Part I, 386, 387 (1916).

"The New Physical and Chemical Laboratory of the Pennsylvania Railroad Company at Altoona." XV, Part II, 348 (1915).

Yield point and proportional limit. XVI, Part II, 441 (1916).

YOUNG, J. B.

Report of Committee A-2 on Wrought Iron. (Secretary.) XIII, 183 (1913); XIV, Part I, 144 (1914); XV, Part I, 121 (1915); XVI, Part I, 147 (1916); XVII, Part I, 130 (1917); XVIII, Part I, 142 (1918); XIX, Part I, 174 (1919); XX, Part I, 143 (1920).

YOUNG, R. B.

Fineness of cement. XIX, Part II, 416 (1919).

Proportioning of concrete. XIX, Part II, 502 (1919).

"Some Theoretical Studies on Proportioning Concrete by the Method of Surface Area of Aggregates." XIX, Part II, 444 (1919).

"The Volume-Moisture Relation in Sand and a Method of Determining Surface Area Based Thereon. XX, Part II, 137 (1920).

YOUNG, S. E.

"Strength of Lime Mortar." XIV, Part II, 338 (1914).

Z

ZIMMERSCHIED, K. W.

Heat treatment of steel. XIII, 527, 532, 546 (1913); XV, Part II, 25, 39 (1915).

"Influence of Mass in the Heat Treatment of Steel." XIII, 510 (1913).

Strength and hardness of steels. XV, Part II, 60 (1915).

TABLE OF CONTENTS
OF
PROCEEDINGS.

VOLUME XIII.

Summary of the Proceedings of the Sixteenth Annual Meeting.

The Application of Specifications—Annual Address by the President, Robert W. Hunt.

Annual Report of the Executive Committee.

Report of Committee A-1 on Standard Specifications for Steel.

Appendix I. Proposed Changes in Present Standard Specifications for Steel.

Appendix II. Condensed Report of the Investigation of Reinforcing Bars Rerolled from Steel Rails, conducted under Instructions from Sub-Committee V, on Steel Reinforcing Bars, of Committee A-1—W. K. Hatt.

Appendix III. Report of the Investigation of Wrought Steel Wheels, conducted under the Direction of Sub-Committee VII, on Rolled Steel Wheels and Steel Tires, of Committee A-1.

Standard Specifications for:

Medium-Carbon Steel Splice Bars.
High-Carbon Steel Splice Bars.
Extra-High-Carbon Steel Splice Bars.
Structural Steel for Ships.
Rivet Steel for Ships.
Rail-Steel Concrete Reinforcement Bars.
Cold-Rolled Steel Axles.
Wrought Solid Carbon-Steel Wheels for Electric Railway Service.
Blooms, Billets and Slabs for Carbon-Steel Forgings.

Report of Committee A-2 on Standard Specifications for Wrought Iron.

Standard Specifications for Wrought-Iron Plates.

Report of Committee A-4 on Heat Treatment of Iron and Steel.

Proposed Recommended Practice for the Heat Treatment of Case-Hardened Carbon-Steel Objects.

Report of Committee A-8 on Standard Specifications for Cold-Drawn Steel.

Tentative Specifications for Cold-Drawn Steel—Bessemer Automatic Screw Stock.

Tentative Specifications for Cold-Drawn Steel—Open-hearth Automatic Screw Stock.

Report of Committee A-10 on Hardness Tests.

Report of Committee B-1 on Standard Specifications for Copper Wire.

Report of Committee B-2 on Non-Ferrous Metals and Alloys.

Standard Specifications for Lake Copper Wire Bars, Cakes, Slabs, Billets, Ingots, and Ingot Bars.

Standard Specifications for Electrolytic Copper Wire Bars, Cakes, Slabs, Billets, Ingots, and Ingot Bars.

Report of Committee C-1 on Standard Specifications for Cement.
Report of Committee C-2 on Reinforced Concrete.
Appendix. Report on Concrete and Reinforced Concrete adopted by the Joint Committee on Concrete and Reinforced Concrete, November 20, 1912.
Report of Committee C-3 on Standard Specifications for Brick.
Proposed Standard Specifications for Building Brick.
Proposed Standard Specifications for Paving Brick.
Report of Committee C-4 on Standard Specifications and Tests for Clay and Cement Sewer Pipes.
Report of Committee C-6 on Standard Tests and Specifications for Drain Tile.
Report of Committee C-7 on Standard Specifications for Lime.
Proposed Standard Specifications for Lime.
Report of Committee D-1 on Preservative Coatings for Structural Materials.
Report of Sub-Committee B on Inspection of the Havre de Grace Bridge.
Appendix. Reports of Inspection of Havre de Grace Bridge by Various Railroads.
Report of Sub-Committee C on Paint Vehicles.
Appendix I. Detail Results of Tests of Soya Bean Oils and Tung Oils.
Appendix II. Specifications for Turpentine.
Report of Sub-Committee D on the Atlantic City Steel Paint Tests.
Report of Sub-Committee E on Linseed Oil.
Standard Specifications for the Purity of Raw Linseed Oil from North American Seed.
Report of Sub-Committee F on the Definition of Terms Used in Specifications.
Proposed Standard Definitions of Terms Used in Paint Specifications.
Report of Sub-Committee J on the Testing of White Paints.
Report of Committee D-4 on Standard Tests for Road Materials.
Minority Report.
Report of Committee D-5 on Standard Specifications for Coal.
Report of Committee D-8 on Waterproofing Materials.
Report of Committee D-11 on Standard Specifications for Rubber Products.
Report of Committee E-1 on Standard Methods of Testing.
Report of Committee E-5 on Regulations Governing the Form but not the Substance of Specifications.
Report of Committee E-6 on Papers.
Appendix. Regulations Governing Papers, Committee Reports and Discussions.
Oxygen in Iron and Steel: Value of Existing Methods for Its Determination—W. R. Fleming.
Effect of Size of Section on Physical Properties Developed by Heat Treatment—J. H. Nead.
Influence of Mass in the Heat Treatment of Steel—K. W. Zimmerschied.
Heat Treatment of Hypo-Eutectoid Carbon-Steel Castings—J. H. Hall.
Mechanical Tests of Heat-Treated Spring Steel—R. P. Devries.
Resistance of Steels to Wear in Relation to Their Hardness and Tensile Properties—George L. Norris.
Magnetic Criteria of the Mechanical Properties of a One-per-cent-carbon Steel—Charles W. Burrows.
Rail Failures and Their Causes—M. H. Wickhorst.
Results of Tests of Welded Boiler Tubes—E. L. Lasier.
Notes on the Property of Toughness of Metals—Albert F. Shore.

Tests on the Rate of Corrosion of Metals—A. W. Carpenter.
Lead-Tin-Antimony and Tin-Antimony-Copper Alloys—William Campbell.
Strength of Cast Zinc or Spelter—Gilbert Rigg and G. M. Williams.
Study of Bearing Metals and Methods of Testing—T. D. Lynch.
Estimation of Fine Particles in Cement by Rate of Hydration—H. S. Spackman.
Thermal Activities of Portland Cement during the Period of Setting—Louis N. Beals, Jr.
Results Obtained with the Autoclave Tests for Cement—H. J. Force.
Observations on the Testing of Sand—W B. Reinke.
Action of Various Substances on Cement Mortars—Richard K. Meade
Tests of Natural Concrete Aggregates—R. S. Greenman.
Tests of Mortars Made from Wisconsin Aggregates—M. O. Withey.
Tests of Reinforced Concrete Slabs under Concentrated Loading—A. T. Goldbeck.
Test of a 40-foot Reinforced Concrete Highway Bridge—D. A. Abrams.
Testing of Chinese Wood Oil—E. W. Boughton.
Outline of a Test for Indicating the Relative Priming and Top-Coat Values of Different Paints—M. McNaughton.
Coal-Tar and Asphalt Products for Waterproofing—S. T. Wagner.
Testing of Refractories—A. V. Bleininger.
Relation between the Tests for the Wearing Qualities of Road-Building Rocks—L. W. Page.
Large-Capacity Testing Machines in United States and England—E. L. Lasier.
Spherical Bearings—Mont Schuyler
Use of the Strain Gage in the Testing of Materials—W. A. Slater and H. F. Moore.
Method and Apparatus for Determining Consistency—Cloyd M. Chapman.
Screen-Scale Sieves Made to a Fixed Ratio—G. A. Disbro.
Extractor for Bituminous Paving Mixtures—C. N. Forrest.
Conservation and Shipping Containers—B. W. Dunn.
Suggestion as to Standard Specifications to Promote Efficiency and Safety in Explosives Used in Blasting—C. P. Beistle.

VOLUME XIV.

PART I.

Summary of the Proceedings of the Seventeenth Annual Meeting.
The Relation between Research and the Activities of the Society—Annual Address by the President, Arthur N. Talbot.
Annual Report of the Executive Committee.
    Appendix I. Abstract of the Minutes of the Executive Committee.
    Appendix II. By-Laws Revised as Proposed by the Executive Committee.
Report on Proceedings of Turin Meeting of the Council of the International Association for Testing Materials—Henry M. Howe, Life Member of Council.
Report of Committee A-1 on Standard Specifications for Steel.
    Appendix I. Regulations Governing Committee A-1.
    Appendix II. Proposed Revisions in Present Standard Specifications for Steel.
    Appendix III. Values of Percentages of Elongation and Reduction of Area based on Inverse Ratio of the Tensile Strength.
    Appendix IV. Report on Proof Tests of Finished Forgings.
    Appendix V. Report on Permissible Variations in Weight and Gage of Sheared Plates.
    Minority Report.

Report of Committee A-2 on Standard Specifications for Wrought Iron.
Report of Committee A-3 on Standard Specifications for Cast Iron and Finished Castings.
Appendix I. Progress Report of the American Members of International Committee 1 (*b*) on Specifications for Cast Iron.
Appendix A. Proposals for International Export Specifications for Pig Iron.
Appendix B. Proposals for Internationsl Export Specifications for the Cast-Iron Test Bar.
Appendix C. Proposals for International Export Specifications for Cast-Iron Pipe and Fittings.
Appendix D. Proposal of the English Members of Committee 1 (*b*) for International Export Specifications for Pig Iron.
Report of Committee A-4 on Heat Treatment of Iron and Steel.
Report of Committee A-6 on Magnetic Testing of Iron and Steel.
Report of Committee A-8 on Standard Specifications for Cold-Drawn Steel.
Tentative Specifications for Cold-Drawn Steel: Open-hearth Automatic Screw Stock.
Report of Committee B-1 on Standard Specifications for Copper Wire.
Report of Committee B-2 on Non-Ferrous Metals and Alloys.
Report of Committee C-1 on Standard Specifications for Cement.
Appendix I. Regulations Governing Committee C-1.
Report of Committee C-3 on Standard Specifications for Brick.
Report of Committee C-4 on Standard Specifications and Tests for Clay and Cement Sewer Pipes.
Appendix I. Memoranda of Recommendations for the Laying of Sewer Pipe.
Appendix II. Glossary of Terms.
Report of Committee C-5 on Fireproofing Materials.
Report of Committee C-6 on Standard Tests and Specifications for Drain Tile.
Report of Committee C-7 on Standard Specifications for Lime.
Tentative Specifications for Quicklime.
Tentative Specifications for Hydrated Lime.
Report of Committee D-1 on Preservative Coatings for Structural Materials.
Proposed Standard Definitions of Terms Used in Paint Specifications.
Appendix I. Regulations Governing Committee D-1.
Report of Sub-Committee II on Inspection of Havre de Grace Bridge.
Report of Sub-Committee III on Testing of Paint Vehicles.
Report of Sub-Committee IV in Inspection of Steel Plates at Atlantic City.
Report of Sub-Committee V on Linseed Oil.
Appendix I. Supplementary Report on Density and Thermal Expansion of Linseed Oil.
Report of Sub-Committee VIII on Methods of Analysis of Paint Materials.
Appendix I. Analysis of White Pigments.
Appendix II. Analysis of Red Lead.
Report of Sub-Committee X on Inspection of White-Paint Test Fence at Washington, D. C.
Appendix I. Results of Inspection.
Report of Sub-Committee XI on Paint Thinners other than Turpentine.
Report of Sub-Committee XII on Turpentine.
Appendix I. Supplementary Report on the Density and Thermal Expansion of Turpentines.

Appendix II. Supplementary Report on Refractive Indices of Turpentines.
Appendix III. Supplementary Report on Color of Turpentines.
Proposed Specifications for Turpentine.
Report of Sub-Committee XIII on Shellac.
Appendix I. Determination of Rosin in Shellac.
Appendix II. Insoluble Test for Shellac.
Report of Committee D-2 on Standard Tests for Lubricants.
Proposed Provisional Tests for Lubricants.
Minority Report.
Report of Committee D-4 on Standard Tests for Road Materials.
Proposed Provisional Test for the Determination of the Apparent Specific Gravity of Rock.
Proposed Provisional Test for the Determination of the Absorption of Water per Cubic Foot of Rock.
Proposed Provisional Method for Making a Mechanical Analysis of Broken Stone or Broken Slag.
Proposed Provisional Method for Making a Mechanical Analysis of Mixtures of Sand or other Fine Material with Broken Stone or Broken Slag.
Proposed Standard Definitions of Terms Applicable to Materials Relating to Roads and Pavements.
Report of Committee D-7 on Standard Specifications for Timber.
Report of Committee D-11 on Standard Specifications for Rubber Products.
Report of Committee E-1 on Standard Methods of Testing.
Report of Committee E-4 on Methods of Sampling and Analysis of Coal.
Appendix. Preliminary Report of the Joint Committee on Coal Analysis of the American Society for Testing Materials and the American Chemical Society.
Report of Sub-Committee I on Preparation of Laboratory Samples.
Report of Sub-Committee II on Moisture.
Report of Sub-Committee IV on Volatile Matter.
Report of Sub-Committee V on Fixed Carbon and Ash.
Report of Sub-Committee VI on Sulfur.
Report of Sub-Committee VII on Phosphorus in Ash.
Report of Sub-Committee VIII on Ultimate Analysis.
Report of Sub-Committee IX on Calorimetric Determination.
Report of Committee E-5 on Regulations Governing the Form but not the Substance of Specifications.
Appendix. Regulations Governing Technical Committees.
Report of Committee E-6 on Papers and Publications.

VOLUME XIV.

PART II.

Are the Effects of Simple Overstrain Monotropic?—Henry M. Howe.
Magnetic Habits of Alloy Steels—J. A. Mathews.
Hardness Tests: Relation between Brinell Ball-Test and Scleroscope Readings—J. J. Thomas.
A Failed Axle: Study of an Internal Transverse Fissure—Robert Job.
The Use of Turned Sections in Tension Tests of Reinforcing Bars—E. P. Withrow and L. C. Niedner.
Notes on Chilled Cast Iron—E. B. Tilt.

Considerations Affecting Specifications for Wrought Non-Ferrous Materials—W. Reuben Webster.
Study of the Strength of Non-Ferrous Castings: Comparison of Different Test Specimens—L. P. Webbert.
Method of Sampling and Analysis of Tin, Terne and Lead-Coated Sheets—J. A. Aupperle.
Errors in the Methods of Determining the Time of Setting of Cement—G. M. Williams.
Volume Changes in Portland Cement and Concrete—A. H. White.
Additional Results Obtained with the Autoclave Test for Portland Cement—H. J. Force.
Proportioning Aggregates for Portlant-Cement Concrete—Albert Moyer.
Blast-Furnace Slag as Aggregate in Concrete—W. A. Aiken.
Testing Concrete Aggregates—Cloyd M. Chapman.
Relation between Deformation and Deflection in Reinforced-Concrete Beams—G. A. Maney.
Examination of Concrete Failures for Their Determining Causes—R. S. Greenman.
Strength of Lime Mortar—W. E. Emley and S. E. Young.
Report on a Permeability Test for Paints and Varnishes—A. M. Muckenfuss.
Examination of Chinese Wood Oil—E. E. Ware and C. L. Shumann.
Quantitative Determination of Body and Solvent in Varnish—A. L. Brown.
A Rational Test for Metallic Protective Coatings—J. A. Capp.
Paint Protection for Portland-Cement Surfaces—H. A. Gardner.
Methods for Determining the Melting Points of Asphalts—J. G. Miller and P. P. Sharples.
Specifications and Tests of Glue—Oscar Linder and E. C. Frost.
An Improved Type of Axial Strainometer—Arthur C. Alvarez.
A Simple Compression Machine for Testing Structural Materials—William O. Lichtner.
An Efficiency Testing Machine for Testing Drills, Taps and Dies—T. Y. Olsen.
A New Vibratory Testing Machine and Results Obtained by Its Use—S. V. Hunnings.
A Machine for Testing Clay Products—Mont Schuyler.
Viscosity Measurement and a New Viscosimeter—Alan E. Flowers.
Rubber Belting and Methods of Testing—W. E. Campbell.
An Autographic Friction Testing Machine for Testing Mechanical Rubber Goods—J. M. Bierer.
A Critical Review of the Procedure Governing the Adoption of Standards—Edgar Marburg.

VOLUME XV.

PART I.

Summary of the Proceedings of the Eighteenth Annual Meeting.
Our Rail Specifications—Annual Address by the President, A. W. Gibbs.
Annual Report of the Executive Committee.
    Appendix. Abstract of the Minutes of the Executive Committee.
Report of Committee A-1 on Standard Specifications for Steel.
    Appendix I. Report on Finishing Temperatures of Rails.
    Appendix II. Proposed Revisions in Present Standard Specifications for Steel and Steel Products.
Report of Committee A-2 on Standard Specifications for Wrought Iron.

Report of Committee A-3 on Standard Specifications for Cast Iron and Finished Castings.
Report of Committee A-5 on Corrosion of Iron and Steel.
Report of Committee A-8 on Standard Specifications for Cold-Drawn Steel.
Report of Committee B-1 on Standard Specifications for Copper Wire.
Report of Committee B-2 on Non-Ferrous Metals and Alloys.
Report of Committee C-1 on Standard Specifications for Cement.
Appendix. Report of Sub-Committee on Accelerated Tests of Cement.
Report of Committee C-3 on Standard Specifications for Brick.
Appendix. Additional Data on Building Brick.
Report of Committee C-4 on Standard Tests and Specifications for Clay and Cement Sewer Pipes.
Report of Committee C-6 on Standard Tests and Specifications for Drain Tile.
Report of Committee C-7 on Standard Specifications for Lime.
Report of Committee C-9 on Standard Tests of Concrete and Concrete Aggregates.
Report of Committee C-11 on Standard Specifications for Gypsum and Gypsum Products.
Report of Committee D-1 on Preservative Coatings for Structural Materials.
Report of Sub-Committee II on Inspection of Havre de Grace Bridge.
Report of Special Sub-Committee on Paints used in Havre de Grace Bridge Tests.
Appendix. Description of Paints by Sub-Committee based on Analyses and Those Suggested by Manufacturers.
Report of Sub-Committee III on Testing of Paint Vehicles.
Report of Sub-Committee IV on Inspection of Steel Plates at Atlantic City.
Report of Sub-Committee V on Linseed Oil.
Appendix. Comments of Analysts.
Report of Sub-Committee VI on Definitions of Terms Used in Paint Specifications.
Report of Sub-Committee VIII on Methods of Analysis of Paint Materials.
Report of Sub-Committee X on Inspection of White-Paint Test Fence at Washington, D. C.
Appendix. Fungi Occurring on the White-Paint Test Fence at Washington, D. C.
Report of Sub-Committee XI on Paint Thinners other than Turpentine.
Report of Sub-Committee XII on Turpentine.
Report of Sub-Committee XIII on Shellac.
Report of Special Sub-Committee on Specifications for Sampling of Liquids.
Report of Committee D-2 on Standard Tests for Lubricants.
Minority Reports.
Proposed Standard Tests for Lubricants.
Appendix. Conversion Tables for Saybolt Universal, Engler and Redwood Viscosimeters.
Report of Committee D-4 on Standard Tests for Road Materials.
Appendix I. Report of Special Joint Committee Appointed to Consider Definitions of Road Materials.
Appendix II. Report of Special Joint Committee Appointed to Consider Provisional Tests of Road Materials.
Appendix III. Report of Sub-Committee on Softening Point.
Appendix IV. Report of Sub-Committee on Ductility Tests.
Appendix V. Report of Sub-Committee on Penetration.

Report of Committee D-5 on Standard Specifications for Coal.
Report of Committee D-6 on Standard Specifications for Coke.
Report of Committee D-7 on Standard Specifications for Timber.
Appendix I. Proposed Revisions in Standard Classification of Structural Timber.
Appendix II. Discussion of the Proposed Forest Service Rules for Grading the Strength of Southern Pine Structural Timbers.
Appendix III. Southern Yellow-Pine Timber and Density Grading Rules.
Report of Committee D-8 on Waterproofing Materials.
Report of Committee D-9 on Standard Tests of Insulating Materials.
Report of Committee D-11 on Standard Specifications for Rubber Products.
Proposed Tentative Specifications for Insulated Wire and Cable: 30-per-cent Hevea Rubber.
Report of Committee D-13 on Standard Tests and Specifications for Textile Materials.
Report of Committee E-1 on Standard Methods of Testing.
Report of Committee E-4 on Methods of Sampling and Analysis of Coal.
Appendix. Final Report of the Joint Committee on Coal Analysis of the American Society for Testing Materials and the American Chemical Society.
Report of Committee E-5 on Technical Committees
Appendix. Regulations Governing Technical Committees.
Report of Committee E-6 on Papers and Publications.

VOLUME XV.

PART II.

Some Neglected Phenomena in the Heat Treatment of Steel—M. E. Leeds.
Internal Stresses Developed by Different Quenching Mediums and Their Effects—H. V. Wille.
The Relation between Maximum Strength, Brinell Hardness and Scleroscope Hardness in Treated and Untreated Alloy and Plain Steels—Robert R. Abbott.
The Charpy Impact Test on Heat-Treated Steels—J. J. Thomas.
Micrographic Determination of Surface Decarburization in Heat-Treated Steels—J. G. Ayers, Jr.
Molten Zinc as a Reagent for the Macroscopic Etching of Iron and Steel—Jesse L. Jones.
Fatigue of Copper Alloys—Ernst Jonson.
Battery Zincs: Some Causes of Defective Service—Robert Job and F. F. White.
The Determination of Spelter Coating on Sheets and Wire—J. A. Aupperle.
The Effect of Finer Grinding and a Higher SO_3 Content upon the Physical Properties of Portland Cement—P. H. Bates.
Weight-Volumetric Proportioning of Concrete Aggregates in Testing—J. A. Kitts.
The Microstructure of Concretes—Nathan C. Johnson.
An Investigation of the Strength and Elastic Properties of Concrete-Filled Pipe Columns—F. W. Swain and A. F. Holmes.
The Legal Interpretation of the Word "Vitrified" as Applied to Ceramic Products—Edward Orton, Jr.
A Fungus Bed Test of Wood Preservatives—Cloyd M. Chapman.
Some Experiments on Technical Bitumens—S. R. Church and John Morris Weiss.
The Fusibility of Coal Ash—A. C. Fieldner, A. E. Hall and A. L. Feild.

The New Physical and Chemical Laboratory of the Pennsylvania Railroad Company at Altoona—C. D. Young.
A Universal Strainometer of Simple Design—S. H. Graf.
A Laboratory Method of Determining Pressures on Walls and Bins—J. Hammond Smith.
A Cylinder Friction and Lubrication Testing Apparatus—Alan E. Flowers.
Elastic Limit—T. D. Lynch.
The Failure of Materials under Repeated Stress—H. F. Moore and F. B. Seely.

VOLUME XVI.

PART I.

Summary of the Proceedings of the Nineteenth Annual Meeting.
The Work of Committees—Annual Address by the President, Mansfield Merriman.
Annual Report of the Executive Committee.
Appendix. Abstract of the Minutes of the Executive Committee.
Report of Committee A-1 on Steel.
Appendix I. Proposed Revisions in Standards and Tentative Standards.
Appendix II. Report on Cooperative Analysis of a Low-Sulfur Tool Steel.
Appendix III. Report on Procedure for Standardizing Arsenite Solutions for Manganese Determinations by the A.S.T.M. Standard Method.
Appendix IV. Report on Investigation of Ladle-Test Steel Ingots—J. R. Cain and H. S. Rawdon.
Addendum to Report of Committee A-1.
Report of Committee A-2 on Wrought Iron.
Report of Committee A-3 on Cast Iron and Finished Castings.
Report of Committee A-4 on Heat Treatment of Iron and Steel.
Report of Committee A-5 on Corrosion of Iron and Steel.
Appendix. Analyses of Steel Sheets for Corrosion Tests.
Report of Committee A-6 on Magnetic Properties of Iron and Steel.
Appendix. Tables of Equivalents.
Report of Committee B-1 on Copper Wire.
Report of Committee B-2 on Non-Ferrous Metals and Alloys.
Appendix I. Spelter: Its Grades and Uses.
Appendix II. A Review of the Tin Situation.
Appendix III. The Difficulty of Issuing Figures on Sand-Cast Alloys.
Report of Committee C-1 on Cement.
Report of Committee C-4 on Clay and Cement Sewer Pipe.
Appendix. Analytical Data for Sewer Pipe.
Report of Committee C-6 on Drain Tile.
Report of Committee C-9 on Concrete and Concrete Aggregates.
Report of Committee C-11 on Gypsum and Gypsum Products.
Report of Committee D-1 on Preservative Coatings for Structural Materials.
Report of Sub-Committee III on Testing of Paint Vehicles.
Appendix. Reports of Analysts on Perilla Oil.
Report of Sub-Committee V on Linseed Oil.
Appendix. Comments of Analysts.
Report of Sub-Committee XI on Paint Thinners other than Turpentine.
Report of Sub-Committee XIII on Shellac.
Report of Sub-Committee XIV on Preparation of Iron and Steel Surfaces for Painting.
Appendix. Tentative Schedule of Tests.

Report of Committee D-3 on Methods of Laboratory Sampling and Analysis of Coal.
Report of Committee D-4 on Road Materials.
Appendix. Report of Sub-Committee on Penetration of Bituminous Materials.
Report of Committee D-5 on Coal.
Report of Committee D-6 on Coke.
Report of Committee D-7 on Timber.
Appendix I. The Need of a Quality Classification for Douglas Fir—J. A. Newlin.
Appendix II. Proposed Revisions in Tentative Methods for Sampling and Analysis of Creosote Oil.
Report of Committee D-8 on Waterproofing.
Report of Committee D-10 on Shipping Containers.
Report of Committee D-11 on Rubber Products.
Report of Committee D-13 on Textile Materials.
Appendix I. Method of Studying the Action of Specimens of Textile Fabric during Tests—H. L. Scott.
Appendix II. Comparison of Strip and Grab Methods of Testing Textile Fabric for Tensile Strength—W. S. Lewis.
Appendix III. Comparison of Strip and Grab Methods of Testing Textile Fabric for Tensile Strength—E. D. Walen.
Appendix IV. Determination of Tensile Strength of Duck by the Strip Method —E. D. Walen.
Appendix V. Effect of Unbroken Warp Threads on Tensile Strength of Textile Fabric—John Lind.
Report of Committee E-1 on Methods of Testing.
Report of Committee E-5 on Standing Committees.
Appendix. Regulations Governing Standing Committees.
Report of Committee E-6 on Papers and Publications.

VOLUME XVI.

PART II.

Notes on the Hardening and Tempering of Eutectoid Carbon Steel and on the Shore Test—Henry M. Howe and Arthur G. Levy.
Heat Treatment of Carbon-Steel Locomotive Axles: Water *vs.* Oil Quenching—C. D. Young.
Recrystallization as a Factor in the Failure of Boiler Tubes—A. E. White and H F. Wood.
Aluminum Bronze: Some Recent Tests and Their Significance—W. M. Corse and G. F. Comstock.
An Investigation Leading to Specifications for Brass Condenser Tubes—A. E. White.
A New Form of Specifications for Concrete Aggregates—Cloyd M. Chapman.
A Method of Making Wear Tests of Concrete—D. A. Abrams.
The Strength of Clamped Splices in Concrete Reinforcement Bars—E. L. Lasier.
The Acceptability of Linseed Oil.—C. D. Holley.
Quantitative Test for Resistance of Lubricating Oils to Emulsification—Winslow H. Herschel.
Emulsification of Mineral Lubricating Oils: Apparatus and Test Method—P. H. Conradson.
An Apparatus for Testing the Standard Cast-Iron Arbitration Bar—H. L. Morse.

Endurance and Impact Tests of Metals—D. J. McAdam, Jr.
An Apparatus for Determining Soil Pressures—A. T. Goldbeck and E. B. Smith.
The Development of a Box-Testing Machine and Some Results of Tests—J. A. Newlin and T. R. C. Wilson.
Method for Testing the Durability of Pipe Under Corrosion—F. N. Speller.
Practical Methods for Testing Refractory Fire Brick—C. E. Nesbitt and M. L. Bell.
The Specific Gravity of Non-Homogeneous Aggregates—Prévost Hubbard and F. H. Jackson, Jr.
The Relation between Yield Point and Proportional Limit in Various Grades of Steel—Tropical Discussion formally opened by:
J. E. Howard
T. D. Lynch
H. F. Moore and F. B. Seely.
Some Experiments on the Plastic Elongation of Wire—A. V. de Forest.
Constants and Diagrams for Repeated-Stress Calculations—H. F. Moore and F. B. Seely.
National Standard Specifications and Their Relation to Export Trade—William R. Webster.

VOLUME XVII.

PART I.

Summary of the Proceedings of the Twentieth Annual Meeting.
Our Society—Annual Address by the President, A. A. Stevenson.
Addresses by Past-Presidents:
A. W. Gibbs
Arthur N. Talbot
Robert W. Hunt
Henry M. Howe
Mansfield Merriman
Annual Report of the Executive Committee.
Appendix. Abstract of the Minutes of the Executive Committee.
Report of Committee A-1 on Steel.
Appendix I. Proposed Revisions in Specifications for Steel and Steel Products.
Appendix II. The Rail Situation.
Appendix III. Calculation of Energy Expended in Bending a Beam.
Addendum to Report of Committee A-1.
Report of Committee A-2 on Wrought Iron.
Report of Committee A-3 on Cast Iron.
Report of Committee A-5 on Corrosion of Iron and Steel.
Appendix. Report of Sub-Committee II on Preservative Metallic Coatings for Metals.
Report of Committee B-2 on Non-Ferrous Metals and Alloys.
Appendix I. Proposed Revisions in Standard Specifications for Spelter.
Appendix II. Report of Sub-Committee III on Sand-Cast Metals and Alloys.
Addendum to Report of Committee B-2.
Report of Committee C-1 on Cement.
Report of Committee C-2 on Reinforced Concrete.
Final Report of the Joint Committee on Concrete and Reinforced Concrete.
Report of Committee C-4 on Clay and Cement Sewer Pipe.
Report of Committee C-5 on Fireproofing.

Report of Committee C-6 on Drain Tile.
Report of Committee C-7 on Lime.
Report of Committee C-8 on Refractories.
Appendix. Slag Test for Refractory Brick Used in the Iron and Steel Industry —C. E. Nesbitt and M. L. Bell.
Report of Committee C-9 on Concrete and Concrete Aggregates.
Appendix I. Suggested Methods for Making and Testing Field Specimens of Concrete.
Appendix II. Suggested Colorimetric Tests for Organic Impurities in Sand.
Appendix III. Report of Joint Conference Committee of Committees C-9 and D-4 on Provisional Definitions, Tests and Methods Pertaining to Non-Bituminous Road Materials.
Report of Committee C-10 on Hollow Building Tile.
Appendix I. Compression Tests of Tile.
Appendix II. Absorption Tests of Tile.
Appendix III. Tests of Tile Walls.
Report of Committee D-1 on Preservative Coatings for Structural Materials.
Report of Sub-Committee III on Testing of Paint Vehicles.
Appendix I. Reports of Analysts on Lumbang and Perilla Oils.
Appendix II. Preliminary Report Made in Compliance with the Department of State's Instruction concerning the Sources of Lumbang and Perilla Oils.
Report of Sub-Committee V on Linseed Oil.
Appendix. Reports of Analysts.
Report of Sub-Committee VIII on Methods of Analysis of Paint Materials.
Report of Sub-Committee IX on Varnish.
Appendix. Reports of Analysts.
Report of Sub-Committee XI on Paint Thinners other than Turpentine.
Appendix I. Tests of 1914 Series.
Appendix II. Tests of 1915 Series.
Appendix III. Tests of 1917 Series.
Report of Sub-Committee XIV on the Preparation of Iron and Steel Surfaces for Painting.
Appendix. Record of Preparation and Painting of Surfaces as Outlined in Tentative Schedule of Tests.
Report of Sub-Committee XV on Specifications for Pigments Dry and in Oil when Marketed in the Form.
Addendum to Report of Committee D-1.
Report of Committee D-2 on Lubricants.
Report of Committee D-4 on Road Materials.
Appendix I. Proposed Tentative Revision of Standard Method for Distillation of Bituminous Materials Suitable for Road Treatment.
Appendix II. Report on British Standard Nomenclature of Bituminous Materials.
Report of Committee D-7 on Timber.
Report of Committee D-8 on Waterproofing.
Report of Committee D-9 on Electrical Insulation.
Report of Committee D-10 on Shipping Containers.
Report of Committee D-11 on Rubber Products.
Report of Committee D-13 on Textile Materials.

Report of Committee E-1 on Methods of Testing.
Appendix. Report of Sub-Committee on Effect of Form and Size and Test Piece.
Report of Committee E-3 on Revision of Pipe Threads.
Report of Committee E-4 on Magnification Scales for Micrographs.
Report of Committee E-5 on Standing Committees.
Appendix I. Changes in the Regulations Governing Standing Committees.
Appendix II. Statement of Sub-Committee on Classification of Standing Committees and Standards.
Report of Committee E-6 on Papers and Publications.

VOLUME XVII.

PART II.

Topical Discussion on the Rôle of the Several Alloying Elements in the Alloy Steels.
Manganese—Henry M. Howe.
Nickel—R. R. Abbott.
Silicon—W. E. Ruder.
Vanadium—G. L. Norris.
Chrome Vanadium—F. J. Griffiths.
Annealing Temperatures and Grain Growth—D. J. McAdam, Jr.
Some Application of Magnetic Analysis to the Study of Steel Products—Charles W. Burrows.
Hardness of Hard-Drawn Copper—E. H. Peirce.
Electrolytic Determination of Tin on Tinned Copper Wire—G. G. Grower.
Light *vs.* Heavy Reductions in Cold Working Brass—W. Reuben Webster.
Testing of Sheet Brass—C. H. Davis.
Interior Surface Defects on Brass Condenser Tubes as a Cause of Corrosion—W. Reuben Webster.
Inspection of Brass and Bronze—Alfred D. Flinn and Ernst Jonson.
High-Silica Portland Cement—A. W. K. Billings.
Apparent Specific Gravity of Non-Homogeneous Fine Aggregates—A. S. Rea.
Properties of Cement-Lime-Sand Mortars—Warren E. Emley.
Economical Proportions for Portland-Cement Mortars and Concrete—J. A. Kitts.
Effects of Grading of Sands and Consistency of Mix upon the Strength of Plain and Reinforced Concrete—L. N. Edwards.
Effect of Rate of Application of Load on the Compressive Strength of Concrete—D. A. Abrams.
Tests of Concrete Slabs to Determine the Effect of Removing Excess Water Used in Mixing—A. N. Johnson.
Tests of Concrete Road Aggregates—J. P. Nash.
Comparison of Heat-Insulating Properties of Materials Used in Fire-Resistive Construction—W. A. Hull.
Failure of a 30-in. Tile Drain at Albert Lea, Minnesota—R. W. Crum.
Suggested Improvements in the Manufacture of Silica Brick—C. E. Nesbitt and M. L. Bell.
Optical Properties and Theory of Color of Pigments and Paints—H. E. Merwin.
Metal Primer Tests—H. A. Gardner.
Determination of Absolute Viscosity by the Saybolt Universal and Engler Viscosimeters—Winslow H. Herschel.
Effect of Controllable Variables on the Toughness Test for Rock—F. H. Jackson, Jr.

Rapid Semi-Autographic Tests for Determining the Proportional Limit—H. F. Moore.
An Alternating Torsion Testing Machine—D. J. McAdam, Jr.
A New Consistency Tester for Viscous Liquid Bituminous Materials—Prévost Hubbard and F. P. Pritchard.
Method for Studying the Effects of Temperature upon the Physical Condition of Asphalts, Waxes, etc.—J. A. Capp and F. A. Hull.
Distribution of Pressures through Earth Fills—A. T. Goldbeck.

VOLUME XVIII.

PART I.

Summary of the Proceedings of the Twenty-first Annual Meeting.
Appendix I. Members Present or Represented.
Appendix II. Constitution and Rules of Procedure of the Proposed American Engineering Standards Committee.
Engineering Societies: Their Utilities and Justification—Annual Address by the President, Gen. Wm. H. Bixby.
Annual Report of the Executive Committee.
Appendix. Abstract of the Minutes of the Executive Committee.
Report of Committee A-1 on Steel.
Appendix I. Proposed Revisions in Specifications for Steel and Steel Products.
Appendix II. The Rail Situation.
Addendum to Report of Committee A–1.
Report of Committee A-2 on Wrought Iron.
Appendix. Proposed Revisions in Specifications for Wrought Iron.
Addendum to Report of Committee A–2.
Report of Committee A-3 on Cast Iron.
Report of Committee A-5 on Corrosion of Iron and Steel.
Appendix I. Analysis of Steel Sheets for Corrosion Tests.
Appendix II. Report of Sub-Committee on Inspection of the Fort Sheridan, Pittsburgh and Annapolis Tests.
Appendix III. Structure of Commercial Zinc Coatings—H. S. Rawdon.
Appendix IV. Method of Making the Salt-Spray Corrosion Test—A. N. Finn.
Report of Committee A-6 on Magnetic Properties.
Appendix. Proposed Revisions in Standard Tests for Magnetic Properties of Iron and Steel.
Report of Committee B-2 on Non-Ferrous Metals and Alloys.
Appendix. Determination of Manganese in Manganese Bronze.
Addendum to Report of Committee B–2.
Report of Committee C-1 on Cement.
Report of Committee C-2 on Reinforced Concrete.
Report of Committee C-4 on Clay and Cement Sewer Pipe.
Appendix. Proposed Revisions in Tentative Specifications for Sewer Pipe.
Addendum to Report of Committee C–4.
Report of Committee C-5 on Fireproofing.
Addendum to Report of Committee C–5.
Report of Committee C-8 on Refractories.
Report of Committee C-10 on Hollow Building Tile.
Appendix. Tests of Hollow Building Tile.

Report of Committee D-1 on Preservative Coatings for Structural Materials.
Report of Sub-Committee V on Linseed Oil.
Appendix. Reports of Analysts.
Report of Sub-Committee VIII on Methods of Analysis of Paint Materials.
Report of Sub-Committee IX on Varnish.
Report of Sub-Committee XI on Paint Thinners other than Turpentine.
Report of Sub-Committee XIV on the Preparation of Iron and Steel Surfaces for Painting.
Appendix. Report of Inspection of Test Panels, February, 1918.
Report of Committee D-2 on Lubricants.
Appendix. Report of Sub-Committee on Evaporation Tests.
Report of Committee D-4 on Road Materials.
Appendix I. Proposed Revision in the Standard Method for Distillation of Bituminous Materials Suitable for Road Treatment.
Appendix II. Proposed Revision in the Standard Method for Making a Mechanical Analysis of Sand or Other Fine Highway Material, except for Fine Aggregates Used in Cement Concrete.
Report of Committee D-5 on Coal.
Report of Committee D-6 on Coke.
Report of Committee D-7 on Timber.
Report of Committee D-8 on Waterproofing.
Report of Committee D-9 on Electrical Insulating Materials.
Report of Committee D-10 on Shipping Containers.
Report of Committee D-11 on Rubber Products.
Addendum to Report of Committee D-11.
Report of Committee D-13 on Textile Materials.
Appendix I. Regulations Governing Committee D-13 on Textile Materials.
Appendix II. Table of Corrected Tensile Strengths of Fabric and Yarn at Various Moisture Regains.
Appendix III. Report of Sub-Committee III on Testing Machines.
Appendix IV. Identification of Manila Fiber—C. E. Swett.
Appendix V. Effect of Moisture on the Tensile Strength of Aircraft Fabrics—G. B. Haven.
Report of Committee E-1 on Methods of Testing.
Appendix I. Proposed Revisions in the Standard Methods of Testing.
Appendix II. Tension Tests of Steel with Test Specimens of Various Size and Form—H. F. Moore.
Report of Committee E-3 on Revision of Pipe Threads.
Report of Committee E-4 on Magnification Scales for Micrographs.
Report of Committee E-5 on Standing Committees.
Appendix. Regulations Governing Standing Committees.
Report of Committee E-6 on Papers and Publications.

VOLUME XVIII.

PART II.

Topical Discussion on Cooperation in Industrial Research:
Opening Announcement—Edgar Marburg.
General Introduction—Henry M. Howe.

Recent Developments in Great Britain—John Johnston.
Organization of Industrial Research—Arthur D. Little.
Developments in Industrial Research—Charles L. Reese.
Cooperative Research in the American Canning Industry—Frank E. Gorrell.
Development of Existing Agencies—Alfred D. Flinn.
Cooperation of the Portland Cement Association and Lewis Institute in Experimental Studies of Concrete—Duff A. Abrams.
Some Practical Views of Research—J. S. Unger.
Cooperation between Governmental Bureaus and the Industries in Research on War Problems—S. R. Church.
Grain Size of Iron as Affected by Temperature—D. J. McAdam, Jr.
Changes Within the Critical Range of a Given Steel: From Ac_1 to Ac_{3-2}—J. G. Ayres, Jr.
Cast Steel Anchor Chain—H. Jasper Cox.
Topical Discussion on Season and Corrosion Cracking of Brass.
Season Cracking and Splitting of Condenser Tubes and Pipes—William Campbell.
The Causes and Prevention of Corrosion Cracking—H. W. Bassett.
Season Cracking—W. Reuben Webster.
Initial Stress and Corrosion Cracking—P. D. Merica and R. W. Woodward.
The Prevention of Season and Corrosion Cracking of Brass Artillery Cases by Special Heat Treatment—W. B. Price.
The Use of Mercury Solutions for Predicting Season Cracking in Brass—Henry S. Rawdon.
The Evaluation of Zinc Dust: A Proposed Method of Analysis—L. A. Wilson.
Proportioning the Materials of Mortars and Concretes by Surface Areas of Aggregates—L. N. Edwards.
Effects of Grading of Sands and Consistency of Mix Upon the Strength of Plain and Reinforced Concrete—L. N. Edwards.
Effect of Age on the Strength of Concrete—Duff A. Abrams.
The Necessity for Inspection and Testing of Refractory Brick—C. E. Nesbitt and M. L. Bell.
Silica Cement—R. J. Montgomery.
The Standard Saybolt Universal Viscosimeter—Winslow H. Herschel.
The Variable-Pressure Method for the Measurement of Viscosity—E. C. Bingham.
Internal-Combustion Engine: Lubrication and Lubricants—P. H. Conradson.
The Sampling of Deposits of Road Stone and Gravel in the Field—L. Reinecke and K. A. Clark.
An Abrasion Test for Stone, Gravel and Similar Aggregates—H. H. Scofield.
Transverse Testing under Non-Uniformly Distributed Load with Special Application to Airplane Wing Ribs—Irving H. Cowdrey.
A Simple Type of Brinell Testing Machine for 500-kg. Load—A. V. de Forest.
A New Method of Obtaining Brinell Hardness—J. G. Ayers, Jr.
Sumner Elastic-Limit Recorder—J. L. Jones and C. H. Marshall.

VOLUME XIX.

PART I.

Summary of the Proceedings of the Twenty-second Annual Meeting.

EDGAR MARBURG MEMORIAL SECTION.

Resolution adopted by the Society at 1918 Annual Meeting.
Program of Exercises at the Memorial Session.
Addresses delivered at the Memorial Session:
Introductory Remarks on behalf of the Executive Committee—President, G. H. Clamer.
Edgar Marburg's Contributions to Engineering—John M. Goodell.
Edgar Marburg: His Early Activities in the Society—Robert W. Lesley.
Edgar Marburg: His More Recent Service in the Society—Arthur N. Talbot.
Edgar Marburg: A Personal Tribute—Robert W. Hunt.
Closing Remarks by the Chairman, A. A. Stevenson.
Biographical Sketch of Edgar Marburg—C. L. Warwick.
Resolutions, Minutes and Notices on the Death of Edgar Marburg.
Standardization—Annual Address by the President, G. H. Clamer.
Annual Report of the Executive Committee.
Appendix. Abstract of the Minutes of the Executive Committee.
Report of Committee A-1 on Steel.
Appendix I. Report of Sub-Committee II on Specifications for Plates for Forge Welding.
Appendix II. Report of Sub-Committee XII on Ladle Test Ingot Investigation.
Addendum to Report of Committee A-1.
Report of Committee A-2 on Wrought Iron.
Report of Committee A-5 on Corrosion of Iron and Steel.
Report of Sub-Committee II on Preservative Metallic Coatings.
Report of Sub-Committee III on Inspection of the Fort Sheridan, Pittsburgh and Annapolis Tests.
Appendix. Re-Analyses of Doubtful Elements in Corrosion Tests Conducted under Auspices of Committee A-5.
Report of Committee A-7 on Malleable Castings.
Report of Committee B-1 on Copper Wire.
Report of Committee B-2 on Non-Ferrous Metals and Alloys.
Report of Committee C-1 on Cement.
Report of Committee C-2 on Reinforced Concrete.
Report of Committee C-3 on Brick.
Appendix. A Study of the Proposed A.S.T.M. Tentative Specifications for Building Brick and a Correlation of Their Requirements with Sodium-Sulfate Treatment and Actual Freezing—Edward Orton, Jr.
Report of Committee C-4 on Clay and Cement Sewer Pipe.
Addendum to Report of Committee C-4.
Report of Committee C-6 on Drain Tile.
Report of Committee C-7 on Lime.
Report of Committee C-8 on Refractories.
Report of Committee C-9 on Concrete and Concrete Aggregates.
Appendix. Abrams-Harder Field Test for Organic Impurities in Sands.
Report of Committee C-11 on Gypsum.
Appendix I. Tentative Report on Gypsum Plasters.
Appendix II. Tentative Report on Design of Reinforced Gypsum Beams.
Report of Committee D-1 on Preservative Coatings for Structural Materials.
Report of Sub-Committee III on Testings of Paint Vehicles.

Report of Sub-Committee XI on Paint Thinners other than Turpentine.
Appendix. Report of U. S. Bureau of Standards on Tag Closed Testers.
Report of Sub-Committee XII on Turpentine.
Report of Sub-Committee XIV on the Preparation of Iron and Steel Surfaces for Painting.
Appendix. Report of Inspection of Test Panels, February, 1919.
Report of Sub-Committee XVI on Terms Used in Reporting the Service Condition of Painted Surfaces.
Report of Committee D-2 on Lubricants.
Report of Committee D-3 on Methods of Sampling and Analysis of Coal.
Report of Committee D-4 on Road Materials.
Report of Committee D-10 on Shipping Containers.
Report of Committee D-11 on Rubber Products.
Appendix. Proposed Revision of Tentative Specifications for Rubber Belting for Power Transmission.
Report of Committee D-13 on Textile Materials.
Report of Committee E-1 on Methods of Testing.
Appendix. Standardization of Methods for the Determination of Density—H. W. Bearce.
Report of Committee E-4 on Magnification Scales for Micrographs.
Report of Committee E-6 on Papers and Publications.

VOLUME XIX.

PART II.

Topical Discussion on Magnetic Analysis:
Magnetic Analysis as a Criterion of the Quality of Steel and Steel Products—Charles W. Burrows and Frank P. Fahy.
Magnetic Surveys on New and Failed Rails—P. H. Dudley.
Application of Magnetic Analysis to the Testing of Ball Bearing Races—R. L. Sanford and M. F. Fischer.
Location of Flaws in Rifle Barrel Steel by Magnetic Analysis—R. L. Sanford and W. B. Kouwenhoven.
Certain Aspects of Magnetic Analysis—C. Nusbaum.
A Systematic Investigation of the Correlation of the Magnetic and Mechanical Properties of Steel—N. J. Gebert.
The Magnetic-Mechanical Analysis of Cast Iron—S. R. Williams.
General Discussion.
Modern High Speed Steel—John A. Mathews.
Deep Etching of Rails and Forgings—F. M. Waring and K. E. Hofammann.
Some Fatigue Tests of Nickel Steel and Chrome-Nickel Steel—H. F. Moore and Arthur G. Gehrig.
The Influence of Very Low Percentages of Copper in Retarding the Corrosion of Steel—D. M. Buck.
Some Physical Constants of American Malleable Cast Iron—H. A. Schwartz.
The Behavior of Wrought Manganese Bronze Exposed to Corrosion while under Tensile Stress—P. D. Merica and R. W. Woodward.
Some Tests of Light Aluminum Casting Alloys: the Effect of Heat Treatment—P. D. Merica and C. P. Karr.
Effect of Fineness of Cement—D. A. Abrams.

Cements Producing Quick-Hardening Concrete—P. H. Bates.
Some Theoretical Studies on Proportioning Concrete by the Method of Surface Area of Aggregates—R. B. Young.
Proportioning of Pit-Run Gravel for Concrete—R. W. Crum.
Modulus of Elasticity of Concrete—Stanton Walker.
Relation between Methods of Curing Standard Concrete Specimens and Their Compressive Strength at 28 Days—Howard W. Green.
Preventable Defects in Refractory Brick—C. E. Nesbitt and M. L. Bell.
Paint, a Plastic Material and not a Viscous Liquid: the Measurement of Its Mobility and Yield Value—E. C. Bingham and Henry Green.
A Viscosimeter for Gasoline—Winslow H. Herschel.
Steam Hose—H. J. Force.
Wire Testing Extensometer—T. D. Lynch and P. H. Brace.
Fatigue Testing Machine—F. M. Farmer.
The Single Blow Notched Bar Impact Test as Used in the American Industry—E. H. Dix, Jr.
Development of Brinell Hardness Tests on Thin Brass Sheet—S. L. Goodale and R. M. Banks.
Apparatus for Determination of Breaking Point of Pitches—H. E. Lloyd and P. P. Sharples.

VOLUME XX.

PART I.

Summary of the Proceeding of the Twenty-third Annual Meeting.
Annual Address by the President—J. A. Capp.
Annual Report of the Executive Committee.
    Appendix. Excerpts from Minutes of the Executive Committee.
Report of Committee A-1 on Steel.
    Appendix I. Proposed Revisions in Standards and Tentative Standards for Steel.
    Appendix II. Preliminary Program of Tests Adopted by the Joint Committee on Investigation of Phosphorus and Sulfur in Steel.
Report of Committee A-2 on Wrought Iron.
Report of Committee A-5 on Corrosion of Iron and Steel.
    Report of Sub-Committee II on Preservative Metallic Coatings.
    Report of Sub-Committee III on Inspection of the Fort Sheridan, Pittsburgh, and Annapolis Tests.
    Report of Sub-Committee V on Total Immersion Tests.
Report of Committee A-8 on Magnetic Analysis.
Report of Committee B-2 on Non-Ferrous Metals and Alloys.
    Appendix. Proposed Revisions in Standards and Tentative Standards for Non-Ferrous Metals.
Report of Committee C-1 on Cement.
Report of Committee C-2 on Reinforced Concrete.
    Appendix. By-Laws of the Joint Committee on Standard Specifications for Concrete and Reinforced Concrete.
Report of Committee C-3 on Brick.
Report of Committee C-4 on Clay and Cement Sewer Pipe.
    Appendix. Proposed Revisions in Tentative Specifications for Sewer Pipe.
    Addendum to Report of Committee C-4.

Report of Committee C-6 on Drain Tile.
Report of Committee C-7 on Lime.
Report of Committee C-8 on Refractories.
Appendix. Vital Factors in the Testing of Fire-Clay Refractories and in the Interpretation of Results—Raymond M. Howe.
Report of Committee C-9 on Concrete and Concrete Aggregates.
Appendix I. Outline of Compression Tests of Concrete for Investigation of Properties of Concrete Mixtures.
Appendix II. Effect of Tannic Acid on the Strength of Concrete—Duff A. Abrams.
Appendix III. Report of Sub-Committee VI on Weight, Voids, Density, Specific Gravity and Consistency.
Report of Committee C-11 on Gypsum.
Report of Committee D-1 on Preservative Coatings for Structural Materials.
Report of Sub-Committee III on Testing of Paint Vehicles.
Report of Sub-Committee XII on Turpentine.
Report of Committee D-2 on Lubricants.
Report of Sub-Committee III on Sulfur Determination.
Report of Sub-Committee V on Emulsification.
Appendix. Determination of Resistance of Lubricating Oils to Emulsification.
Report of Committee D-3 on Methods of Sampling and Analysis of Coal.
Report of Committee D-4 on Road Materials.
Appendix I. Report of Collaborative Tests of Sectional Committee on Penetration Relative to Modification of the Standard Needle.
Appendix II. Proportions and Quantities of Materials for Concrete for Highway Construction—Duff A. Abrams.
Report of Committee D-6 on Coke.
Report of Committee D-7 on Timber.
Report of Committee D-10 on Shipping Containers.
Report of Committee D-11 on Rubber Products.
Report of Committee D-13 on Textile Materials.
Appendix I. Variables Affecting the Indicated Breaking Strength of Cotton Fabrics—W. O. Jelleme.
Appendix II. Machine Rate-of-Load as Affecting Breaking Strength Shown by Fabric Testing Machines—W. O. Jelleme.
Appendix III. Effect of Jaws on Fabric Strength—J. H. Dunlap, A. E. Jury, and W. O. Jelleme.
Report of Committee E-4 on Magnification Scales for Micrographs.
Report of Committee E-5 on Standing Committees.
Report of Committee E-6 on Papers and Publications.

VOLUME XX.

PART II.

Molybdenum as an Alloying Element in Structural Steels—G. W. Sargent.
A Note on Stresses Caused by Cold-Rolling—H. M. Howe and E. C. Groesbeck.
On the Shattered Zones in Certain Steel Rails, with Notes on the Interior Origin of Transverse Fissures—J. E. Howard.
Effect of Machining and of Cross-Section on the Tensile Properties of Malleable Cast Iron—H. A Schwartz.

Chain Cable and Some of its Physical Properties—C. G. Lutts.
A Note on the Constitution of Certain Tin-Bearing Brasses—William Campbell.
Fatigue and Impact Fatigue Tests of Aluminum Alloys—W. A. Gibson.
The Volume-Moisture Relation in Sand and a Method of Determining Surface Area Based Thereon—R. B. Young and W. D. Walcott.
Effect of Hydrated Lime and Other Powdered Admixtures in Concrete—D. A. Abrams.
Effect of Rodding Concrete—F. E. Giesecke.
Some Determinations of the Stress-Deformation Relations for Concretes under Repeated and Continuous Loadings—G. M. Williams.
Impact Test on Concrete to Regulate Coarse and Fine Aggregate Qualities and Mixes for Highways—H. S. Mattimore.
The Standard Deval Abrasion Test for Rock—F. H. Jackson.
Some Relations between the Characteristics of Steam-Distilled Petroleum Residuals —B. A. Anderton.
The So-Called Asphalt Content of Road Oils—B. A. Anderton and D. G. Taylor.
The Uses and Properties of Water-resistant Plywood—A. Elmendorf.
Construction of Steam Hose—J. M. Bierer.
Improved Elastic Limit Recorder—C. H. Marshall.
A High-Speed Alternating Torsion Testing Machine—D. J. McAdam, Jr.
An Apparatus for Delicate Elexure Tests and Some Results of Such Tests—W. J. Francke.
A New Method for Calibrating Brinell Hardness Testing Machines—J. L. Jones and C. H. Marshall.
Ductility Testing Machines—T. Y. Olsen.
A New Type of Automatic Cement Tester—T. Y. Olsen.
A New Method of Testing Galvanized Coatings—Allerton S. Cushman.
An Instrument for Measuring the Hiding Power of Paints—R. L. Hallett.
A New Colorimeter for White Pigments and Some Results Obtained by Its Use—A. H. Pfund.
Further Development of the Plastometer and its Practical Application to Research and Routine Problems—H. Green.
Testing of Porosity of Electric Porcelain—W. D. A. Peaslee.

TA
401
A5
Index
v.13-20
cop.2

American Society for
Testing and Materials
Proceedings

[redacted]

Engineering

PLEASE DO NOT REMOVE
CARDS OR SLIPS FROM THIS POCKET

UNIVERSITY OF TORONTO LIBRARY

ENGIN STORAGE

ENGIN STORAGE